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SINGLE STATION FLOOD FREQUENCY ANALYSIS NORTHWEST TERRITORIES

W. Aitken P.Eng.
H. Westerman

Water Planning and Management Branch

NWT Programs
Inland Waters Directorate
Western and Northern Region
Conservation & Protection
Environment Canada
Yellowknife, NWT

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Single Station

Flood Frequency Analysis

Northwest Territories

W. Aitken P.Eng.
Hydrologist
NWT Programs, Yellowknife

H. Westermann
Hydrologist (Term)
NWT Programs, Yellowknife

Water Planning & Management Branch
Inland Waters Directorate
Western and Northern Region
Conservation & Protection
Environment Canada
Yellowknife, NWT

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Abstract

It is essential that the hydrometric network be operated in the most efficient manner possible. To attain this goal the NWT office of Inland Waters/Lands has made evaluation and planning of the NWT network a priority. The initial steps in the evaluation and planning process include an inventory of the existing network and preliminary analysis or screening of the data.

This report is a catalogue of maximum daily disharges at hydrometric stations in the Northwest Territories with ten (10) or more years of record and a frequency analysis of these peak discharges. The results of this study will be input to a regionalization exercise that will eventually be used to determine whether and where more hydrometric stations are required or whether and where stations are redundant and may be removed. It should be emphasized that this study deals only with one of the three major hydrologic characteristics, that being peak discharges. The characteristics of total annual flow and low flows will have to be dealt with in the future.

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Introduction

This report is intended to be a catalogue of peak flow data and analysis of all stations in the Northwest Territories with ten (10) or more years of data. The data have been analyzed using the computer program 'CFA'. Outputs from this program that have been appended to this report include a table of the data in chronological and rank order with probabilities and return periods assigned to each data set; a summary of statistics and parameters obtained using a 3 parameter log-normal distribution analysis of the data, and a plot of the data on log-probability paper. Also in the report are summary tables and figures which include a station list; period of record; station location map; drainage areas; maximum discharges; and flood estimates for standard return period and coefficients of skew and kurtosis.

The Data

At the present time a data review is being carried out at several stations and more will be done in the years to come. Users of this document should check the input data prior to use. The data used were extracted from the 1984 Historical Streamflow Summary for the NWT and Yukon, and 1985 data was withdrawn from the office Hydex files. Where one or two years of peak discharge data were not published but their inclusion would increase the continuous period of record for that station every attempt was made to fill in the missing peaks. To this end the

hydrometric station records were examined to see if a peak discharge could be estimated. If records of the station in question could not be used then adjacent stations were examined to estimate a peak for this missing year. Although it is preferable to use maximum instantaneous discharge data for studies of this type, being preliminary to a regional frequency study, it was decided to use maximum daily discharges. The use of instantaneous discharges would cut an already skimpy data base by more than 55%. Only 10 stations have 10 or more published maximum instantaneous discharges. In the regionalization study an assessment should be made to determine if a sufficient data base of instantaneous peaks is available in each region being considered.

Selection of Stations

The list of stations (Table 1) includes all stations in the NWT with 10 or more years of record and with at least 8 published maximum daily discharges (ie. 2 peaks could be estimated as described earlier). Of the 253 stations listed in the Hydex files only 50 met this criterion. These stations had a total of 829 station years of useable data of which 48 station years (5.8%) had to be estimated.

Three discontinued stations were also included in the stations analyzed. Two of these stations, Baker Creek and Thelon River were moved a short distance making a small change in the drainage area. It was decided to combine the existing and discontinued station using published data with no adjustment for the change in drainage area. The other discontinued

station used was the Mackenzie River Station near Fort Providence. In 1978 this station was changed to a stage only station and therefore no peak discharge data are available for 1979 to 1985. To derive the data for this period the stations on the Mackenzie River at Fort Simpson, the Liard River near the Mouth and the Trout River near the Fort Simpson Highway were used.

Non-Parametric Testing

The computer program CFA does a series of non-parametric tests to determine if the data display trend, serial dependence, randomness and homogeneity. Each of the tests was conducted for all of the stations. For stations that failed any of the tests, the method of dealing with each is summarized below. The most common problem with the data is the presence of serial dependance. This is only a problem if one is critically looking at variance of the T-year events.

Problem Stations

1. **Back River below Deep Rose Lake 10RC001**

   The tests indicated serial dependence in the data. This would be expected on large drainage basins with a large amount of storage as the peak discharge is dependent on the amount of water stored in the basin in the previous year.

2. Cameron River below Reid Lake 07SB010

The tests indicate a slight trend, at the 5% level, in the data. This is probably due to the short period of record at this site. Caution should be taken if using the frequency analysis results from this station.

3. Great Bear River at the Outlet of Great Bear lake 10JC003

The tests indicate that the data are not random, are serially dependent and display trend. This station is at the outlet of a very large lake which probably causes these problems, especially the serial dependence.

4. Liard River at Fort Liard 10ED001H

Four years of unpublished data were used in the frequency analysis of this station. This doubled the continuous period of record for this site. The data were apparently questionable because the observer at this gauge had made errors and ommissions when measuring lower stream levels. Hence the data for most of the period from 1962-1965 were not published. The peak discharge data were not questioned so it was decided to use them. The tests indicate that the data display slight serial dependence and trend.

5. Liard River near the Mouth 10ED002

The tests indicate that the data display a slight trend.

6. Lockhart River at Outlet of Artillery Lake 07RD001

The tests indicate that the data are not random and show a slight serial dependence. When the two earliest peaks were removed from the data set the station passed all the tests.

7. Mackenzie River near Fort Providence 10FB001

The tests indicate that the data are not random.

8. Quoich River above St. Clair Falls 06MB001

The tests indicate that the data display a slight trend.

9. Taltson River at Outlet of Tso Lake 07QA001

The tests indicate that there is serial dependence and that the data are not random. This station is regulated by two man made structures.

10. Thelon River above Beverly Lake 06JC002

The tests indicate there is serial dependence and trend in the data. When two of the earliest peaks were removed from the data set the station passed all the non-parametric tests.

For a number of these stations, especially Back and Thelon rivers, it is expected that the historical data review will produce significant changes to these findings.

Frequency Analysis

The computer program 'CFA' was used to generate the sample statistics, a series of estimated floods for standard return periods and plots of discharge vs. return period for each of the stations. A previous investigation dealing with longer term stations by this office revealed that the 3-parameter log-normal distribution gave the best fit in all cases. A random check of 5 of the 50 stations used in this investigation indicated that this would be true for shorter term stations as well. On this evidence it was decided to include output from the 3 parameter log-normal distribution only. Where this distribution gave a poor fit other distributions were tried to see if a better fit could be obtained. These other plots and printouts are included.

Regulation

A column has been included in Table 1 which indicates the degree to which the peak discharges are modified by storage in the basin. This storage could be natural lakes and swamps or it could be man made reserviors.

The stations are separated into four groups by this exercise. The groups are:

1) Stations with little natural regulation
2) Stations with some natural regulation
3) Stations with a large amount of natural regulation
4) Stations with man made regulation

This characteristic of the basin is an important parameter in the regionalization exercise.

Regionalization

Most locations in the Territories lack the hydrometric data necessary to predict flood flows. Regional analysis must be undertaken to estimate these flows at ungauged sites. Of the stations analyzed, many are not applicable to a regionalization exercise because they are on large rivers that cross more than one homogeneous physiographic region. These stations are identified by a * in Table 1.

Results and Conclusions

1. The decision to select the three Parameter Log Normal Distribution appears to have been a good one. In general the data fit this distribution very well.

   Stations where a poor fit was found fell into two categories.

   1) Short period of record.
   2) High outlier in the sample.

2. Of the 50 stations analized only 30 would be applicable to regional frequency analysis.

Appendix

A. Tables and Figures

A-1. Figure 1 Location Map

A-2. Table 1 Station Information

A-3. Figure 2 Period of Record

A-4. Table 2 Flood Frequency Regime

A-5. Table 3 Coefficients of Skew and Kurtosis

B. Data, Analysis and Plots

B-1. A-C (alphabetical order by station name)

B-2. D-J

B-3. K-M

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NORTHWEST TERRITORIES

SINGLE STATION

FLOOD FREQUENCY

ANALYSIS

LOCATION MAP

FIGURE #1

TABLE 1 STATION INFORMATION

STATION NAME	W.S.C. STN.#	REGION	MAP REF.	GROSS DRAINAGE AREA (sq.km)	MAX RECORDED DAILY 'Q' (cu.m/s)	STORAGE MODIFING FACTOR
ANDERSON RIVER BELOW CARNWATH RIVER	10NC001		1	57200	2300.00	2
ARCTIC RED RIVER NEAR THE MOUTH	10LA002	A	2	18800	1610.00	1
BACK RIVER ABOVE HERMANN RIVER	10RC001	A	3	98200	5370	3
BAKER CREEK NEAR YELLOWKNIFE & LOWER MARTIN	07SB913C		4	144	4.16	3
BIG SMITH NEAR MACKENZIE HWY	10HC003		5	938	143.00	2
BIRCH RIVER AT FORT LIARD HWY	10EB003		6	505	81.30	1
BOSWORTH CREEK AT NORMAN WELLS	10KA003		7	123	15.30	2
BUFFALO RIVER AT HWY NO. 5	07PA001	A	8	17800	329.00	3
CAMERON RIVER BELOW REID LAKE	07SB010		9	3570	29.00	3
CAMSELL RIVER AT OUTLET OF CLUT LAKE	10JA002	A	10	30900	228.00	3
CARIBOU CREEK ABOVE DEMPSTER HWY	10LC007		11	663	65.00	3
COPPERMINE RIVER AT OUTLET OF POINT LAKE	10FB001		12	20300	533.00	3
DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE	06KC003	A	13	67600	881.00	3
FLAT RIVER AT CANTUNG CAMP	10EA002		14	152	22.60	1
FLAT RIVER NEAR THE MOUTH	10EA003		15	8500	1100.00	1
GREAT BEAR R. AT OUTLET OF GREAT BEAR LAKE	10GC003	A	16	146000	852	3
HARRIS RIVER NEAR THE MOUTH	10GC002		17	579	48.30	2
HAY RIVER NEAR HAY RIVER	07OB001	A	18	47900	1350	3
HAYES RIVER ABOVE CHANTREY INLET	10SB001		19	17700	3390.00	1
JEAN-MARIE RIVER AT FORT SIMPSON HWY	10FB005		20	1310	90.60	2
KAKISA RIVER AT OUTLET OF KAKISA LAKE	07UC001		21	14900	196.00	3
KAZAN RIVER ABOVE KAZAN FALLS	06LL001		22	72300	2090.00	3
KAZAN RIVER AT OUTLET OF ENNADAI LAKE	06LA001		23	21300	399.00	3
LIARD RIVER AT FORT LIARD	10ED001H	A	24	222000	16454	1
LIARD RIVER NEAR THE MOUTH	10ED002	A	25	227000	16100	1
LITTLE BUFFALO RIVER NEAR PINE POINT HWY	07FB002		26	3600	34.20	1
LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE	07PD001		27	26700	200.00	3
MACKENZIE RIVER ABOVE ARCTIC RED RIVER	10LA003	A	28	1660000	34000	3
MACKENZIE RIVER AT FORT SIMPSON	10GC001	A	29	1270000	22900	3
MACKENZIE RIVER (EAST CHANNEL) AT INUVIK	10LC002	A	30	N/A	923	3
MACKENZIE RIVER AT NORMAN WELLS	10KA001	A	31	1570000	303000	3
MACKENZIE RIVER NEAR FORT PROVIDENCE	10FB001	A	32	971000	11430	3
MARTIN RIVER NEAR THE MOUTH	10GC003		33	2040	283.00	1
PEEL RIVER ABOVE FORT MCPHERSON	10MC002	A	34	70700	10600.00	1
PRAIRIE CREEK AT CADILLAC MINE	10EC002		35	495	61.90	1
QINGUQ CREEK NEAR BAKER LAKE	06MA002		36	433	90.30	3
QUOICH RIVER ABOVE ST. CLAIR FALLS	06MB001		37	28700	3180	2
RENGLENG RIVER BELOW DEMPSTER HWY	10LC003		38	1440	205.00	2
ROOT RIVER NEAR THE MOUTH	10GA001	A	39	9840	2750.00	1
SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE	07OB002		40	6030	2854.00	3
SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK	10EC001	A	41	33400	6370.00	1
SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS	10EB001		42	14300	2320.00	1
TALTSON RIVER AT OUTLET OF TSU LAKE	07DA001		43	264000	479	4
THELON R. ABOVE BAKER, BELOW SCHULTZ	06MA036C	A	44	154000	6570	3
THELON RIVER ABOVE BEVERLY LAKE	06JC002	A	45	65300	8180.00	2
THOA RIVER NEAR INLET TO HILL ISLAND LAKE	07DC003		46	9630	264.00	1
TREE RIVER NEAR THE MOUTH	10QA001		47	5960	190.00	3
TROUT RIVER AT FORT SIMPSON HWY	10FA002		48	9510	522.00	2
TSICHU RIVER AT CANOL ROAD	10HA002		49	212	47.90	1
WILLOWLAKE RIVER NEAR THE MOUTH	10GB001	A	50	21600	1240.00	1

NOTES

1. 'A' Indicates station may not be applicable to a regionalization exercise.
2. MAP REF. numbers refer to the numbers in Figure 81.
3. STORAGE MODIFYING FACTOR - see the explanation of the notes in the 'REGULATION' section.
4. SUFFIX ON STATION NUMBER - 'H' indicates historical data used. 'C' indicates that stations were combined to produce a longer period of record.

PERIOD OF RECORD

ANNUAL MAXIMUN DAILY DISCHARGE

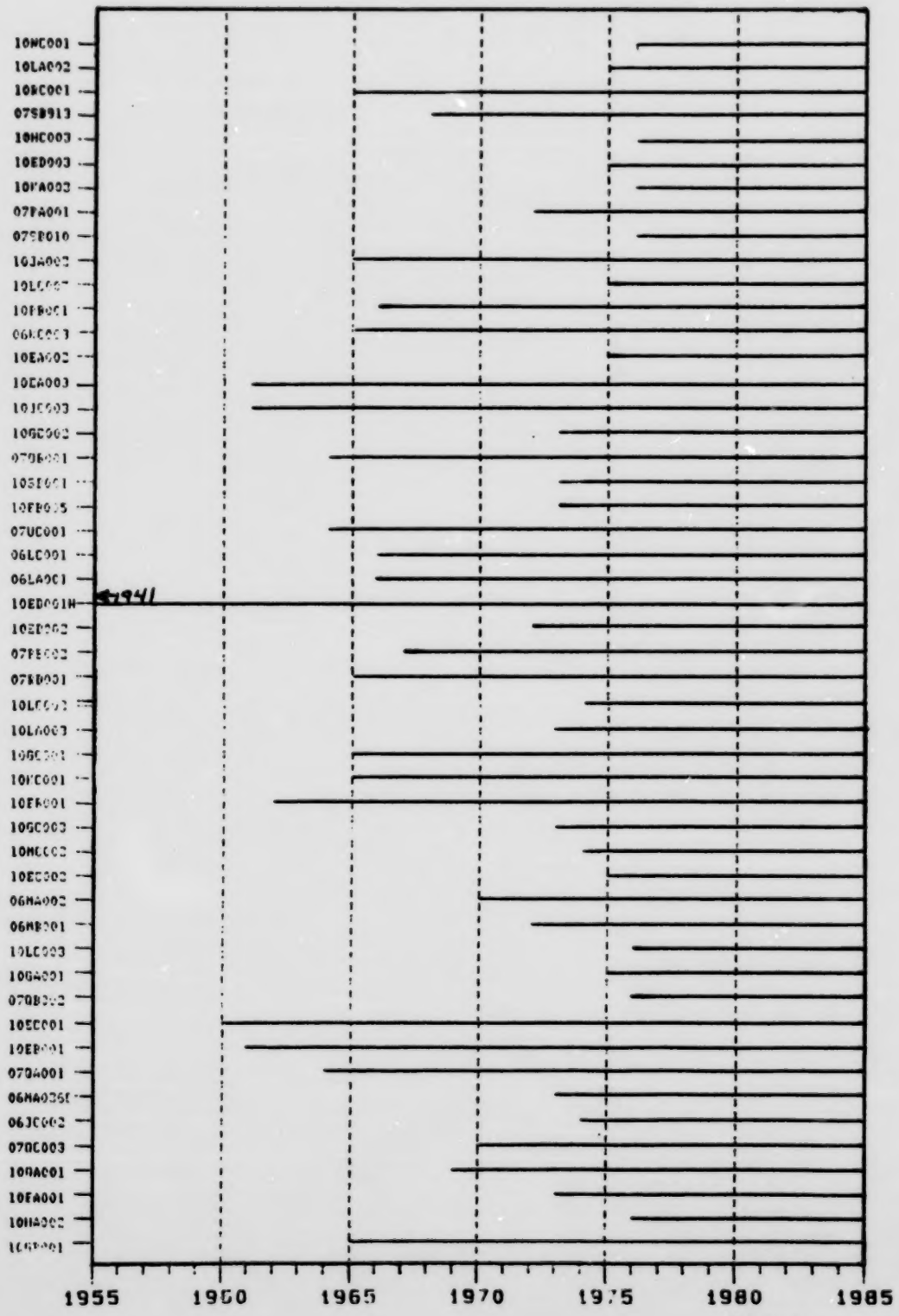


FIGURE 02

TABLE 2 FLOOD FREQUENCY REGIME

STATION NAME	W.S.C. STN. #	1:2	1:10	1:50	1:100	NOTES
ANDERSON RIVER BELOW CARNWATH RIVER	10MC001	1440.00	2310.00	2850.00	3040.00	
ARCTIC RED RIVER NEAR THE MOUTH	10LA002	1160.00	1500.00	1690.00	1760.00	
BACK RIVER ABOVE HERMANN RIVER	10KC001	3900.00	5010.00	5390.00	5790.00	
BAKER CREEK NEAR YELLOWKNIFE & LOWER MARTIN	07SB913C	0.91	2.03	3.32	3.95	A
BIG SMITH NEAR MACKENZIE HWY	10MC003	91.20	129.00	154.00	164.00	
BIRCH RIVER AT FORT LIARD HWY	10ED003	34.70	70.30	99.00	111.00	
BOSWORTH CREEK AT NORMAN WELLS	10KA003	7.68	13.20	17.50	19.20	
BUFFALO RIVER AT HWY NO. 5	07PA001	165.00	288.00	398.00	446.00	
CAMERON RIVER BELOW REID LAKE	07SB010	8.89	29.20	59.10	75.80	A
CANSELL RIVER AT OUTLET OF CLUT LAKE	10JA002	116.00	173.00	228.00	253.00	
CARIBOU CREEK ABOVE DEMPSTER HWY	10LC007	118.00	82.40	242.00	358.00	A
COPPERMINE RIVER AT OUTLET OF POINT LAKE	10PB001	223.00	334.00	436.00	480.00	A
DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE	06KC003	609.00	802.00	970.00	1040.00	
FLAT RIVER AT CANTUNG CAMP	10EA002	15.50	20.10	23.20	24.30	
FLAT RIVER NEAR THE MOUTH	10EA003	571.00	899.00	1200.00	1340.00	
GREAT BEAR R. AT OUTLET OF GREAT BEAR LAKE	10JC003	509.00	738.00	880.00	946.00	
HARRIS RIVER NEAR THE MOUTH	10GC002	18.40	45.50	79.50	96.90	A
HAY RIVER NEAR HAY RIVER	07OB001	733.00	1120.00	1420.00	1550.00	
HAYES RIVER ABOVE CHANTREY INLET	10SB001	1650.00	3120.00	4530.00	5160.00	
JEAN-MARIE RIVER AT FORT SIMPSON HWY	10FB005	46.20	77.40	98.60	107.00	
KAKISA RIVER AT OUTLET OF KAKISA LAKE	07UC001	120.00	186.00	226.00	240.00	
KAZAN RIVER ABOVE KAZAN FALLS	06LC001	1460.00	1910.00	2260.00	2400.00	
KAZAN RIVER AT OUTLET OF ENNADAI LAKE	06LA001	228.00	330.00	402.00	429.00	
LIARD RIVER AT FORT LIARD	10ED001H	8570.00	1240.00	15400.00	16700.00	
LIARD RIVER NEAR THE MOUTH	10ED002	12100.00	15100.00	16400.00	16830.00	
LITTLE BUFFALO RIVER NEAR PINE POINT HWY	07PB002	11.50	29.50	56.20	71.10	A
LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE	07RD001	159.00	187.00	200.00	204.00	
MACKENZIE RIVER ABOVE ARCTIC RED RIVER	10LA003	28900.00	32300.00	35100.00	36300.00	
MACKENZIE RIVER AT FORT SIMPSON	10GC001	17300.00	21300.00	24000.00	25000.00	
MACKENZIE RIVER (EAST CHANNEL)AT INUVIK	10LC002	802.00	936.00	999.00	1020.00	A
MACKENZIE RIVER AT NORMAN WELLS	10KA001	23900.00	28200.00	30800.00	31700.00	
MACKENZIE RIVER NEAR FORT PROVIDENCE	10FB001	7670.00	9570.00	11100.00	11700.00	
MARTIN RIVER NEAR THE MOUTH	10GC003	89.80	168.00	289.00	358.00	
PEEL RIVER ABOVE FORT MCPHERSON	10MC002	7350.00	9800.00	11300.00	11800.00	
PRAIRIE CREEK AT CADILLAC MINE	10EC002	41.80	56.90	65.70	68.70	
QINGUQ CREEK NEAR BAKER LAKE	06MA002	43.10	75.10	107.00	121.00	
QUOICH RIVER ABOVE ST.CLAIR FALLS	06MB001	1480.00	2580.00	3620.00	4080.00	
RENGLENG RIVER BELOW DEMPSTER HWY	10LC003	43.60	125.00	217.00	262.00	A
ROOT RIVER NEAR THE MOUTH	10GA001	1000.00	2160.00	3410.00	4000.00	
SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE	07QB002	199.00	265.00	297.00	308.00	
SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK	10EC001	2180.00	3440.00	5030.00	5860.00	
SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS	10EB001	1440.00	1890.00	2220.00	2350.00	
TALTSON RIVER AT OUTLET OF TSU LAKE	07QA001	276.00	437.00	568.00	622.00	
THELON R. ABOVE BAKER, BELOW SCHULTZ	06MA036C	3050.00	4470.00	5880.00	6530.00	A
THELON RIVER ABOVE BEVERLY LAKE	06JC002	1670.00	4190.00	8400.00	10900.00	
THOA RIVER NEAR INLET TO HILL ISLAND LAKE	07QC003	97.90	189.00	292.00	342.00	
TREE RIVER NEAR THE MOUTH	10QA001	124.00	169.00	203.00	216.00	A
TROUT RIVER AT FORT SIMPSON HWY	10FA002	201.00	382.00	559.00	640.00	
TSICHU RIVER AT CANOL ROAD	10HA002	26.00	42.40	56.20	61.90	
WILLOWLAKE RIVER NEAR THE MOUTH	10GB001	605.00	1030.00	1430.00	1610.00	

NOTES

1. Discharges were calculated using the 3-Parameter Lognormal distribution.

2. 'A' Indicates the 3-Parameter Lognormal distribution fits the data poorly. Print-outs of other distributions are included in Appendix B.

COEFFICIENTS OF SKEW AND KURTOSIS

STATION NAME	W.S.C. NO.	C S	C K
ANDERSON RIVER BELOW CARNWATH RIVER	10NC001	0.114	2.132
ARCTIC RED RIVER NEAR THE MOUTH	10LA002	-0.012	3.988
BACK RIVER BELOW DEEP ROSE LAKE	10RC001	-0.045	2.475
BAKER CREEK NEAR YELLOWKNIFE & LOWER MARTIN	07SB913C	0.225	6.195
BIG SMITH NEAR MACKENZIE HWY	10HC003	-0.044	3.735
BIRCH RIVER AT FORT LIARD HWY	10ED003	-0.112	3.357
BOSWORTH CREEK AT NORMAN WELLS	10KA003	-0.075	3.879
BUFFALO RIVER AT HWY NO. 5	07PA001	-0.092	3.036
CAMERON RIVER BELOW REID LAKE	07SB010	-0.463	3.294
CAMSELL RIVER AT OUTLET OF CLUT LAKE	10JA002	-0.020	3.711
CARIBOU CREEK ABOVE DEMPSTER HWY	10LC007	-0.552	3.690
COPPERMINE RIVER AT OUTLET OF POINT LAKE	10PB001	0.215	6.023
DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE	06KC003	-0.097	2.871
FLAT RIVER AT CANTUNG CAMP	10EA002	0.001	5.079
FLAT RIVER NEAR THE MOUTH	10EA003	-0.093	2.876
GREAT BEAR R. AT OUTLET OF GREAT BEAR LAKE	10JC003	-0.123	2.947
HARRIS RIVER NEAR THE MOUTH	10GC002	-0.285	2.833
HAY RIVER NEAR HAY RIVER	07OB001	0.019	3.296
HAYES RIVER ABOVE CHANTREY INLET	10SB001	-0.161	3.131
JEAN-MARIE RIVER AT FORT SIMPSON HWY	10FB005	0.032	3.781
KAKISA RIVER AT OUTLET OF KAKISA LAKE	07UC001	0.009	2.335
KAZAN RIVER ABOVE KAZAN FALLS	06LC001	-0.080	2.796
KAZAN RIVER AT OUTLET OF ENNADAI LAKE	06LA001	-0.015	3.571
LIARD RIVER AT FORT LIARD	10ED001H	-0.041	2.897
LIARD RIVER NEAR THE MOUTH	10ED002	-0.086	3.286
LITTLE BUFFALO RIVER NEAR PINE POINT HWY	07PB002	-0.232	2.742
LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE	07RD001	-0.079	2.994
MACKENZIE RIVER ABOVE ARTIC RED RIVER	10LA003	0.020	3.937
MACKENZIE RIVER AT FORT SIMPSON	10GC001	-0.030	2.697
MACKENZIE RIVER (EAST CHANNEL) AT INUVIK	10LC002	0.520	2.760
MACKENZIE RIVER AT NORMAN WELLS	10KC001	0.001	2.875
MACKENZIE RIVER NEAR FORT PROVIDENCE	10FB001	-0.062	3.055
MARTIN RIVER NEAR THE MOUTH	10GC003	0.160	5.098
PEEL RIVER ABOVE FORT MCPHERSON	10MC002	-0.005	3.584
PRAIRIE CREEK AT CADILLAC MINE	10EC002	-0.010	3.527
QINGUQ CREEK NEAR BAKER LAKE	06MA002	-0.097	3.668
QUOICH RIVER ABOVE ST. CLAIR FALLS	06MB001	0.006	4.323
RENLENG RIVER BELOW DEMPSTER HWY	10LC003	1.572	6.836
ROOT RIVER NEAR THE MOUTH	10GA001	-0.115	4.190
SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE	07QB002	-0.046	4.135
SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK	10EC001	0.052	4.151
SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS	10EB001	-0.006	3.608
TALTSON RIVER AT OUTLET OF TSU LAKE	07QA001	-0.146	2.076
THELON R. ABOVE BAKER, BELOW SCHULTZ	06MA036C	0.300	7.263
THELON RIVER ABOVE BEVERLY LAKE	06JC002	0.141	5.544
THOA RIVER NEAR INLET TO HILL ISLAND LAKE	07QC003	-0.132	3.560
TREE RIVER NEAR THE MOUTH	10QA001	0.418	2.385
TROUT RIVER AT FORT SIMPSON HWY	10FA002	0.017	4.199
TSICHU RIVER AT CANOL ROAD	10HA002	-0.070	4.335
WILLOWLAKE RIVER NEAR THE MOUTH	10GB001	-0.113	2.950
MEAN		0.006	3.674
C.S. & C.K. of Transform		0.000	3.000
St. Dev.		0.286	1.143

WSC STATION NO=10NC001
WSC STATION NAME=ANDERSON RIVER BELOW CARNWATH RIVER

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1976	793.000	2300.000	1	5.88	17.000
99	1977	1760.000	2240.000	2	15.69	6.375
6	1978	799.000	2000.000	3	25.49	3.923
5	1979	759.000	2000.000	4	35.29	2.833
5	1980	2300.000	1760.000	5	45.10	2.217
5	1981	911.000	1000.000	6	54.90	1.821
5	1982	2240.000	911.000	7	64.71	1.545
6	1983	2000.000	799.000	8	74.51	1.342
5	1984	2000.000	793.000	9	84.31	1.186
5	1985	1000.000	759.000	10	94.12	1.062

NOTE A '99' IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10NC001 ANDERSON RIVER BELOW CARNWATH RIVER

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1456.200	656.021	0.451	0.128	2.140
LN X SERIES	7.184	0.477	0.066	-0.010	2.061
LN(X-A) SERIES	9.639	0.043	0.004	0.114	2.123

X(MIN)= 759.000
X(MAX)= 2300.000
LOWER OUTLIER LIMIT OF X= 498.937

TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

3LN PARAMETERS: A=-13909.479 M= 9.639 S= 0.043

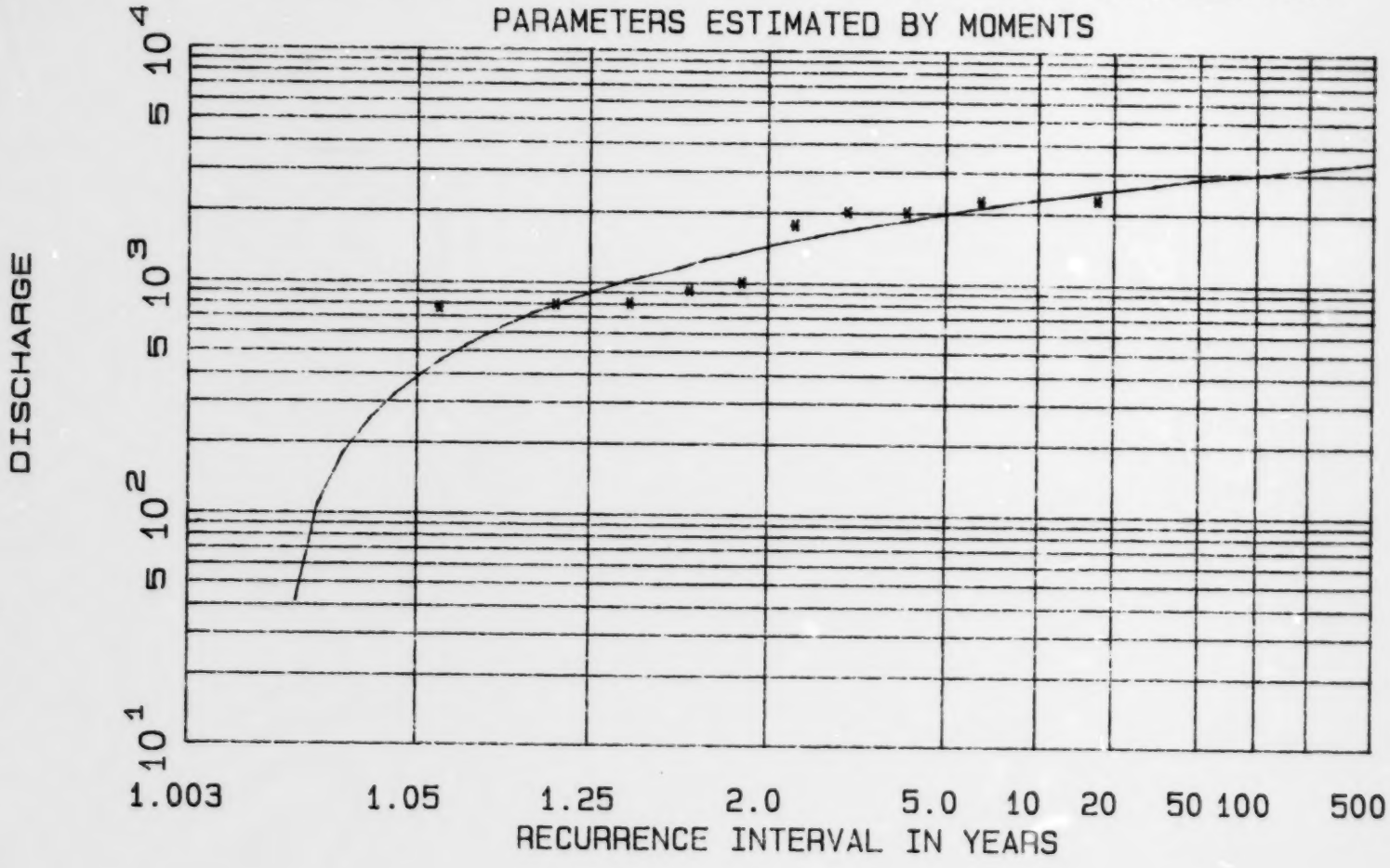
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	387.00
1.250	0.800	901.00
2.000	0.500	1440.00
5.000	0.200	2000.00
10.000	0.100	2310.00
20.000	0.050	2560.00
50.000	0.020	2850.00
100.000	0.010	3040.00
200.000	0.005	3230.00
500.000	0.002	3450.00

10NC001 ANDERSON RIVER BELOW CARNWATH RIVER

FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



WSC STATION NO=10LA002
WSC STATION NAME=ARCTIC RED RIVER NEAR MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1975	1480.000	1610.000	1	5.36	18.667
6	1976	1200.000	1480.000	2	14.29	7.000
5	1977	680.000	1330.000	3	23.21	4.308
6	1978	1330.000	1300.000	4	32.14	3.111
5	1979	1140.000	1200.000	5	41.07	2.435
5	1980	1300.000	1140.000	6	50.00	2.000
7	1981	1120.000	1120.000	7	58.93	1.697
6	1982	1610.000	1050.000	8	67.86	1.474
6	1983	1000.000	1000.000	9	76.79	1.302
6	1984	1050.000	820.000	10	85.71	1.167
5	1985	820.000	680.000	11	94.64	1.057

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10LA002 ARCTIC RED RIVER NEAR MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1157.273	272.143	0.235	-0.107	4.002
LN X SERIES	7.027	0.251	0.036	-0.686	4.551
LN(A-X) SERIES	8.576	0.051	0.006	-0.012	3.988

X(MIN)= 680.000
X(MAX)= 1610.000
LOWER OUTLIER LIMIT OF X= 667.068

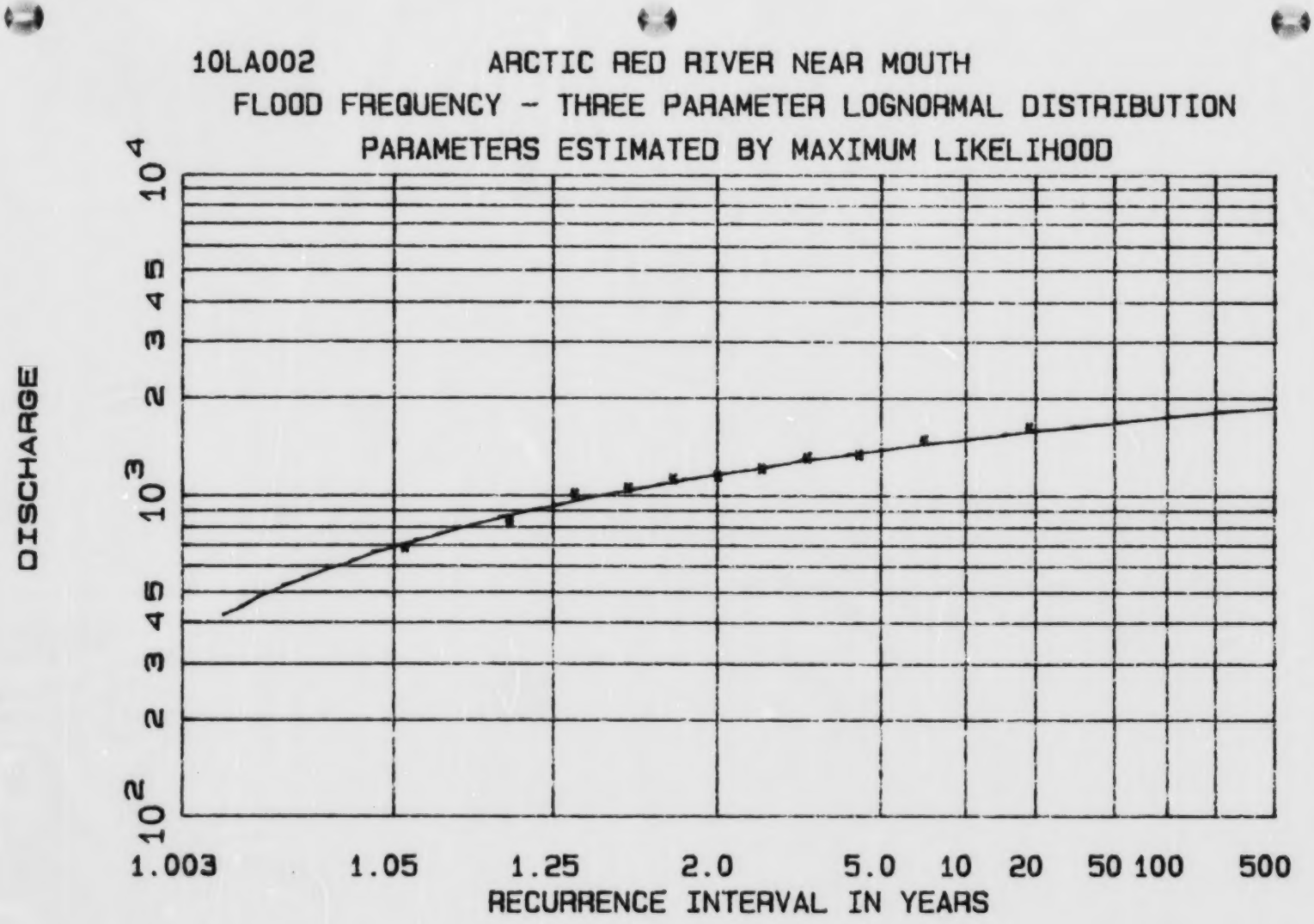
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.6466E+04
3LN PARAMETERS: A= 6465.848 M= 8.576 S= 0.051

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	361.00
1.050	0.952	690.00
1.250	0.800	930.00
2.000	0.500	1160.00
5.000	0.200	1390.00
10.000	0.100	1500.00
20.000	0.050	1590.00
50.000	0.020	1690.00
100.000	0.010	1760.00
200.000	0.005	1820.00
500.000	0.002	1890.00


10LA002 ARCTIC RED RIVER NEAR MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10RC001
WSC STATION NAME=BACK RIVER ABOVE HERMANN RIVER

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1965	4050.000	5370.000	1	2.83	35.333
7	1966	3820.000	5150.000	2	7.55	13.250
7	1967	3990.000	5040.000	3	12.26	8.154
7	1968	4670.000	4930.000	4	16.98	5.889
7	1969	5150.000	4670.000	5	21.70	4.609
6	1970	3060.000	4440.000	6	26.42	3.786
7	1971	2380.000	4280.000	7	31.13	3.212
7	1972	2310.000	4250.000	8	35.85	2.789
6	1973	2830.000	4220.000	9	40.57	2.465
6	1974	2920.000	4050.000	10	45.28	2.208
6	1975	4250.000	3990.000	11	50.00	2.000
6	1976	4220.000	3850.000	12	54.72	1.828
6	1977	3850.000	3820.000	13	59.43	1.683
7	1978	4280.000	3630.000	14	64.15	1.559
7	1979	3630.000	3060.000	15	68.87	1.452
6	1980	2680.000	2980.000	16	73.58	1.359
6	1981	2980.000	2920.000	17	78.30	1.277
7	1982	4440.000	2830.000	18	83.02	1.205
6	1983	5370.000	2680.000	19	87.74	1.140
6	1984	4930.000	2380.000	20	92.45	1.082
6	1985	5040.000	2310.000	21	97.17	1.029

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10RC001 BACK RIVER ABOVE HERMANN RIVER

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	3850.000	932.250	0.242	-0.126	2.430
LN X SERIES	8.226	0.257	0.031	-0.466	2.598
LN(A-X) SERIES	8.953	0.120	0.013	-0.045	2.475

X(MIN)= 2310.000
X(MAX)= 5370.000
LOWER OUTLIER LIMIT OF X= 2014.167

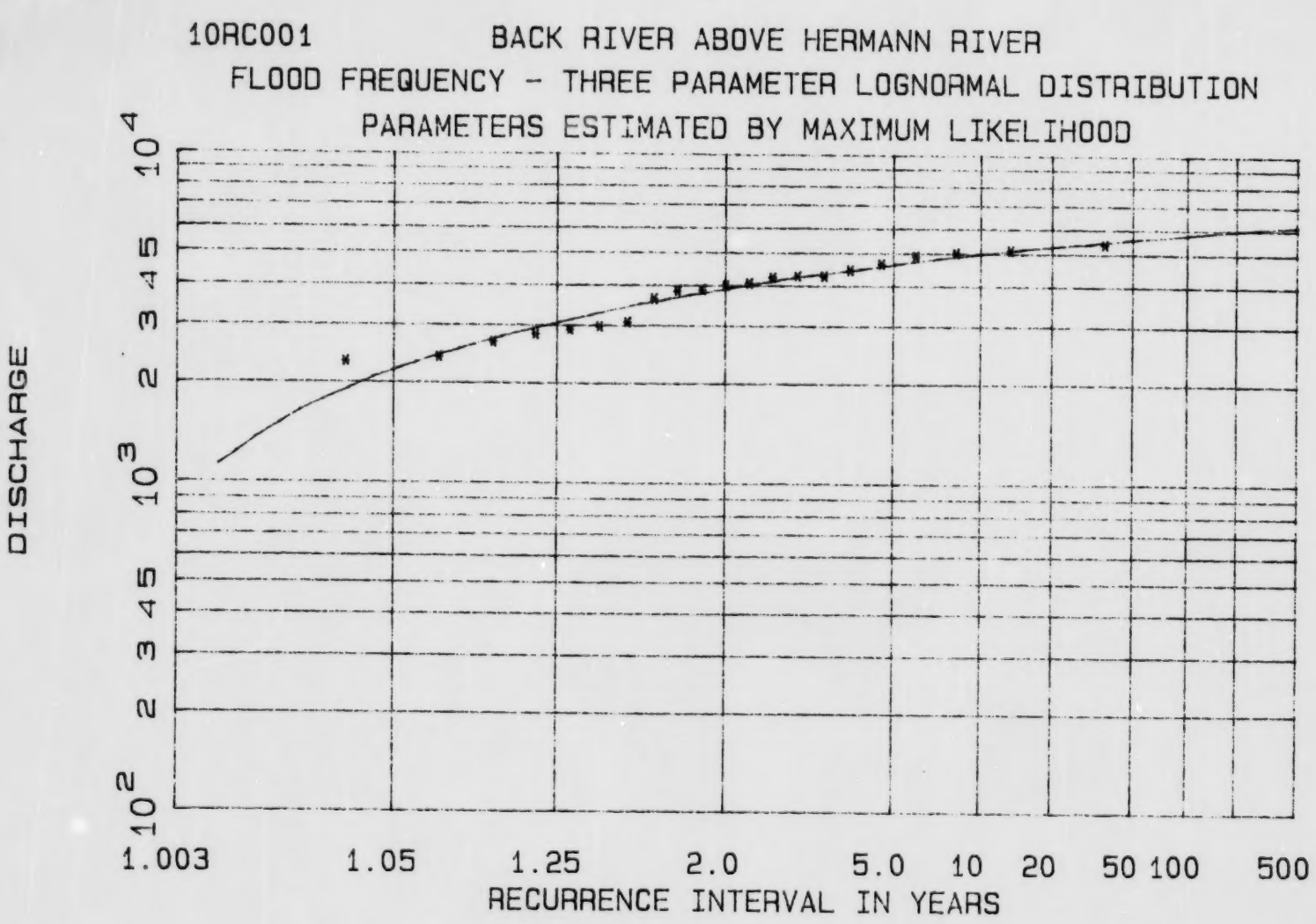
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.1163E+05
3LN PARAMETERS: A= 11634.500 M= 8.953 S= 0.120

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	877.00
1.050	0.952	2190.00
1.250	0.800	3080.00
2.000	0.500	3900.00
5.000	0.200	4650.00
10.000	0.100	5010.00
20.000	0.050	5290.00
50.000	0.020	5590.00
100.000	0.010	5790.00
200.000	0.005	5960.00
500.000	0.002	6160.00


10RC001
BACK RIVER ABOVE HERMANN RIVER
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07SB913C
WSC STATION NAME=BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

MONTH	YEAR	DATA (3) (CMS)	ORDERED (4) (CMS)	RANK (5)	PROB. (6) (%)	RET. PERIOD (7) (YEARS)
(1)	(2)					
6	1968	1.380	5.200	1	3.39	29.500
5	1969	0.813	4.160	2	8.79	11.375
5	1970	0.898	1.400	3	14.09	7.000
99	1971	0.636	1.380	4	19.78	5.056
6	1972	0.648	1.260	5	25.07	3.957
5	1973	0.968	1.260	6	30.77	3.250
5	1974	1.040	1.140	7	36.36	2.750
5	1975	4.160	1.040	8	41.76	2.395
5	1976	1.260	0.988	9	47.25	2.116
5	1977	0.382	0.968	10	52.75	1.896
5	1978	0.784	0.898	11	58.24	1.717
6	1979	1.280	0.813	12	63.74	1.569
6	1980	0.988	0.784	13	69.23	1.444
5	1981	0.260	0.750	14	74.73	1.338
6	1982	1.140	0.648	15	80.22	1.247
6	1982	0.750	0.636	16	85.71	1.167
5	1984	1.400	0.382	17	91.21	1.096
3	1985	5.200	0.260	18	96.70	1.034

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07SB913C BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1.333	1.271	0.954	2.483	9.343
LN X SERIES	0.016	0.704	42.976	0.665	3.333
LN(X-A) SERIES	-0.134	0.810	-6.026	0.226	3.359

X(MIN)= 0.260
X(MAX)= 5.200
LOWER OUTLIER LIMIT OF X= 0.196

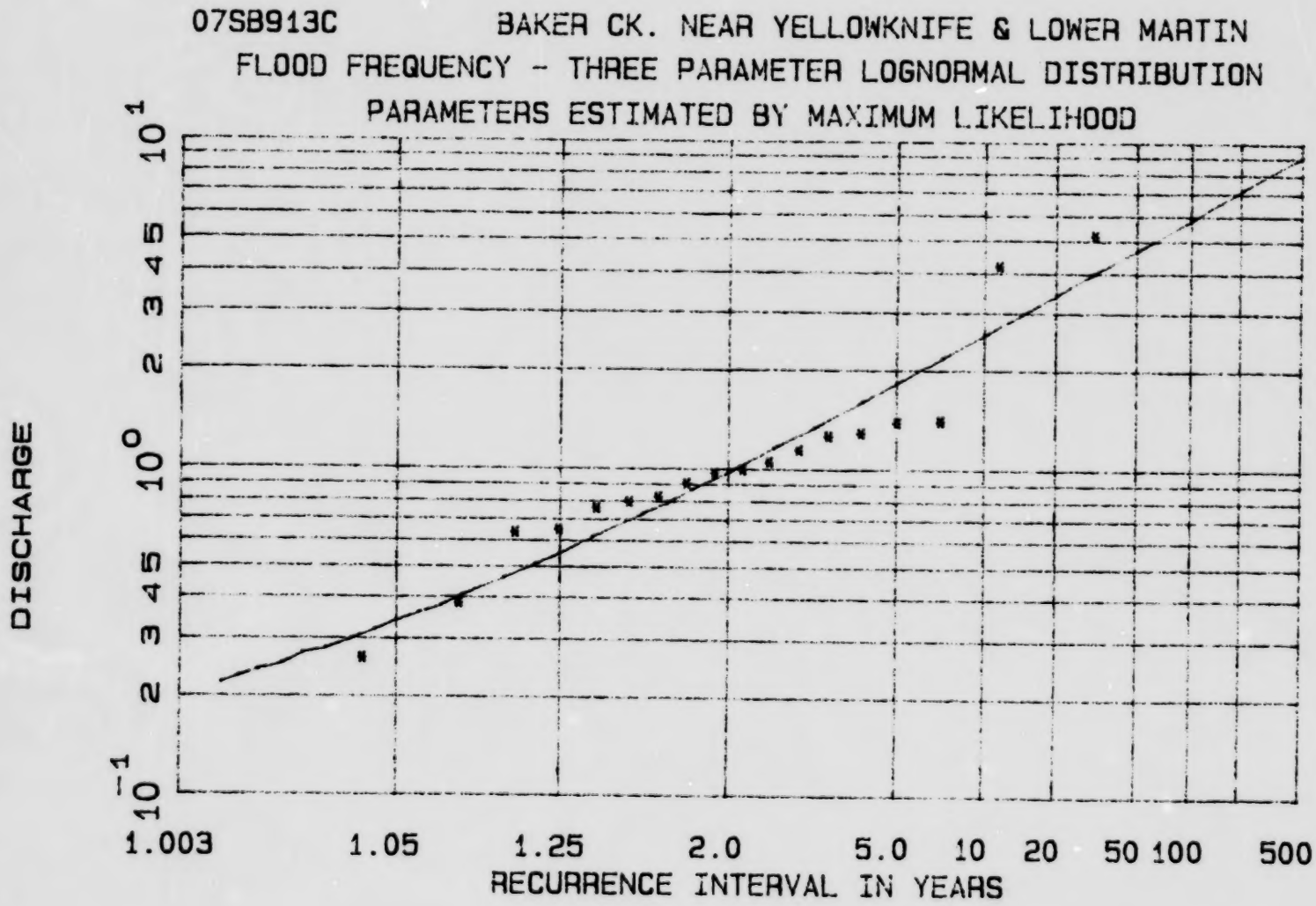
TOTAL SAMPLE SIZE= 18
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 0.111 M=-0.134 S= 0.810

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.20
1.050	0.952	0.34
1.250	0.800	0.55
2.000	0.500	0.98
5.000	0.200	1.84
10.000	0.100	2.58
20.000	0.050	3.42
50.000	0.020	4.72
100.000	0.010	5.86
200.000	0.005	7.15
500.000	0.002	9.10


07SB913C BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^{1}
2 3 4 5
10^{0}
2 3 4 5
10^{-1}
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
07SB913C BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1.333	1.271	0.954	2.483	9.343
LN X SERIES	0.016	0.704	42.976	0.665	5.303

X(MIN)= 0.260
X(MAX)= 5.200
LOWER OUTLIER LIMIT OF X= 0.196

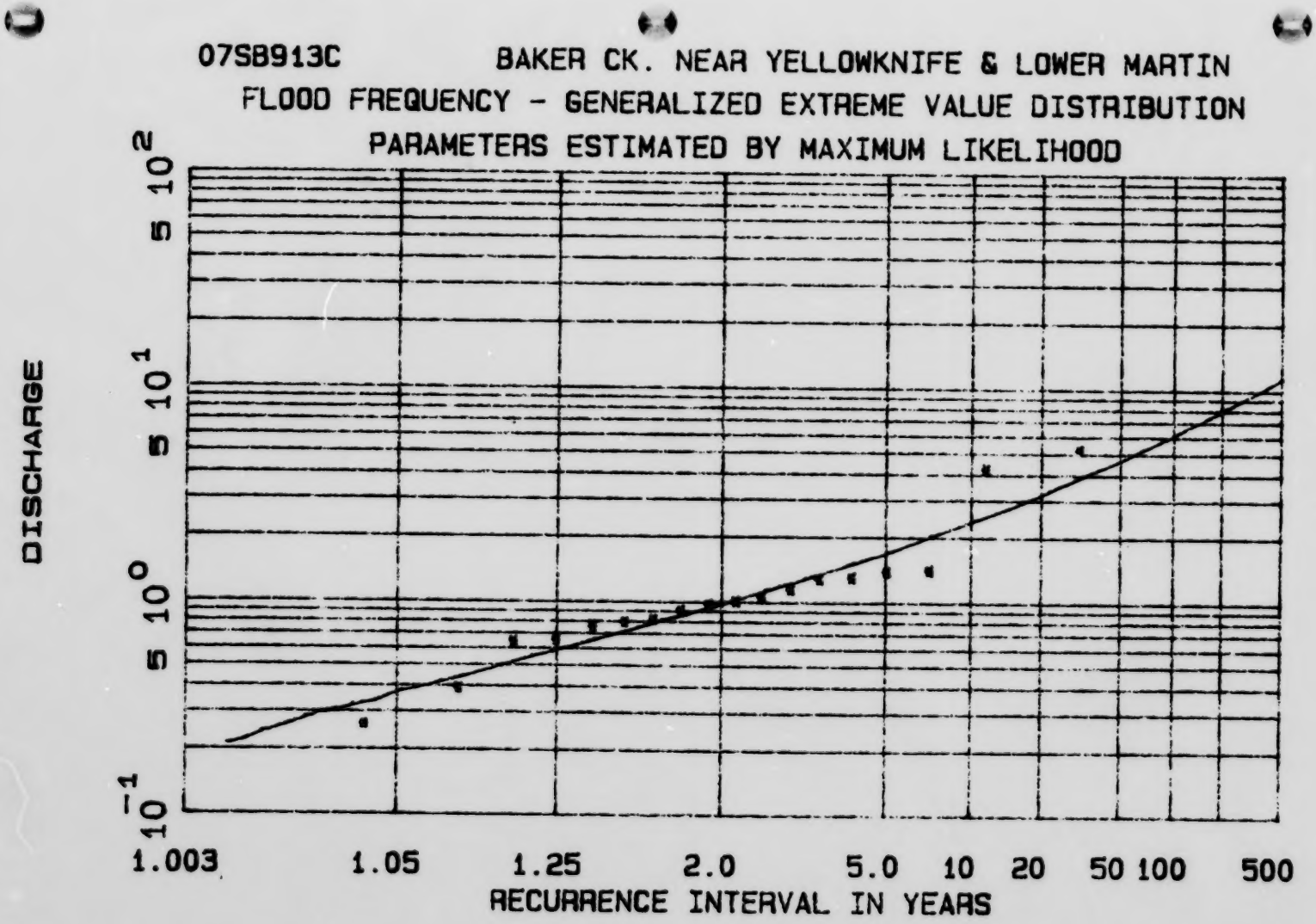
TOTAL SAMPLE SIZE= 18
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

GEV PARAMETERS: U= 0.79 A= 0.464 K= -0.355

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.18
1.050	0.952	0.37
1.250	0.800	0.59
2.000	0.500	0.97
5.000	0.200	1.71
10.000	0.100	2.39
20.000	0.050	3.24
50.000	0.020	4.71
100.000	0.010	6.18
200.000	0.005	8.06
500.000	0.002	11.40


07SB913C
BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^2
5 10^1
5 10^0
10^-1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
07SB913C BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1.333	1.271	0.954	2.483	9.343
LN X SERIES	0.016	0.704	42.976	0.665	5.303

X(MIN)= 0.260
X(MAX)= 5.200
LOWER OUTLIER LIMIT OF X= 0.196

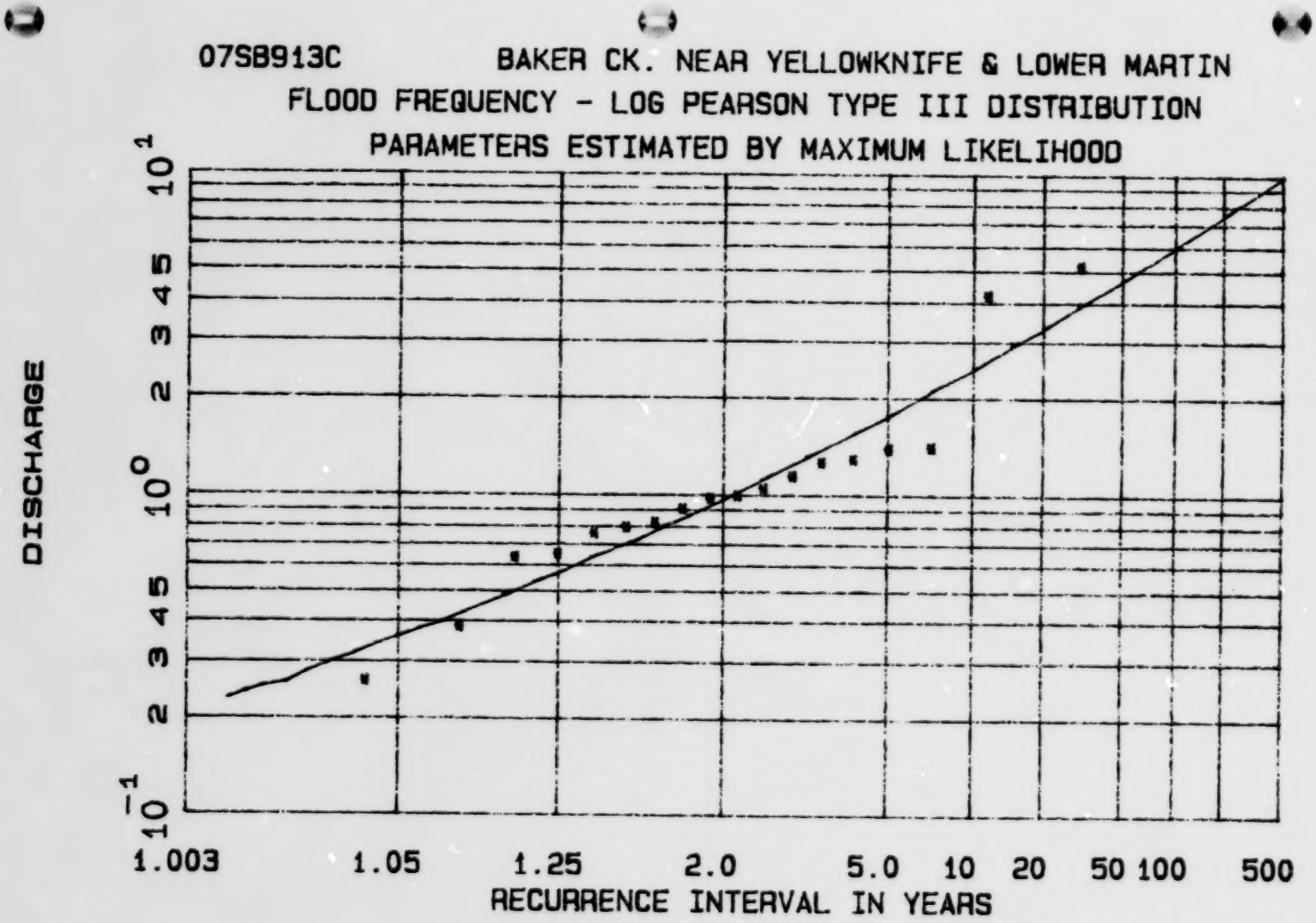
TOTAL SAMPLE SIZE= 18
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

LP3 PARAMETERS: A= 0.1313 B= 26.76 LOG(M)= -3.496
M = 0.3032E-01

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.21
1.050	0.952	0.36
1.250	0.800	0.57
2.000	0.500	0.97
5.000	0.200	1.77
10.000	0.100	2.48
20.000	0.050	3.33
50.000	0.020	4.70
100.000	0.010	5.97
200.000	0.005	7.49
500.000	0.002	9.92


07SB913C
BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN
FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^{1}
2 3 4 5
10^{0}
2 3 4 5
10^{-1}
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
07SB913C BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1.333	1.271	0.954	2.483	9.343
LN X SERIES	0.016	0.704	42.976	0.665	5.303

X(MIN)= 0.260
X(MAX)= 5.200
LOWER OUTLIER LIMIT OF X= 0.196

TOTAL SAMPLE SIZE= 18
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED BY ASSUMING M TO BE ZERO. THE ITERATION ALGORITHM WAS NOT REQUIRED.

M= 0.000 A= 0.588 B= 13.98 C= 0.921 D= 0.460

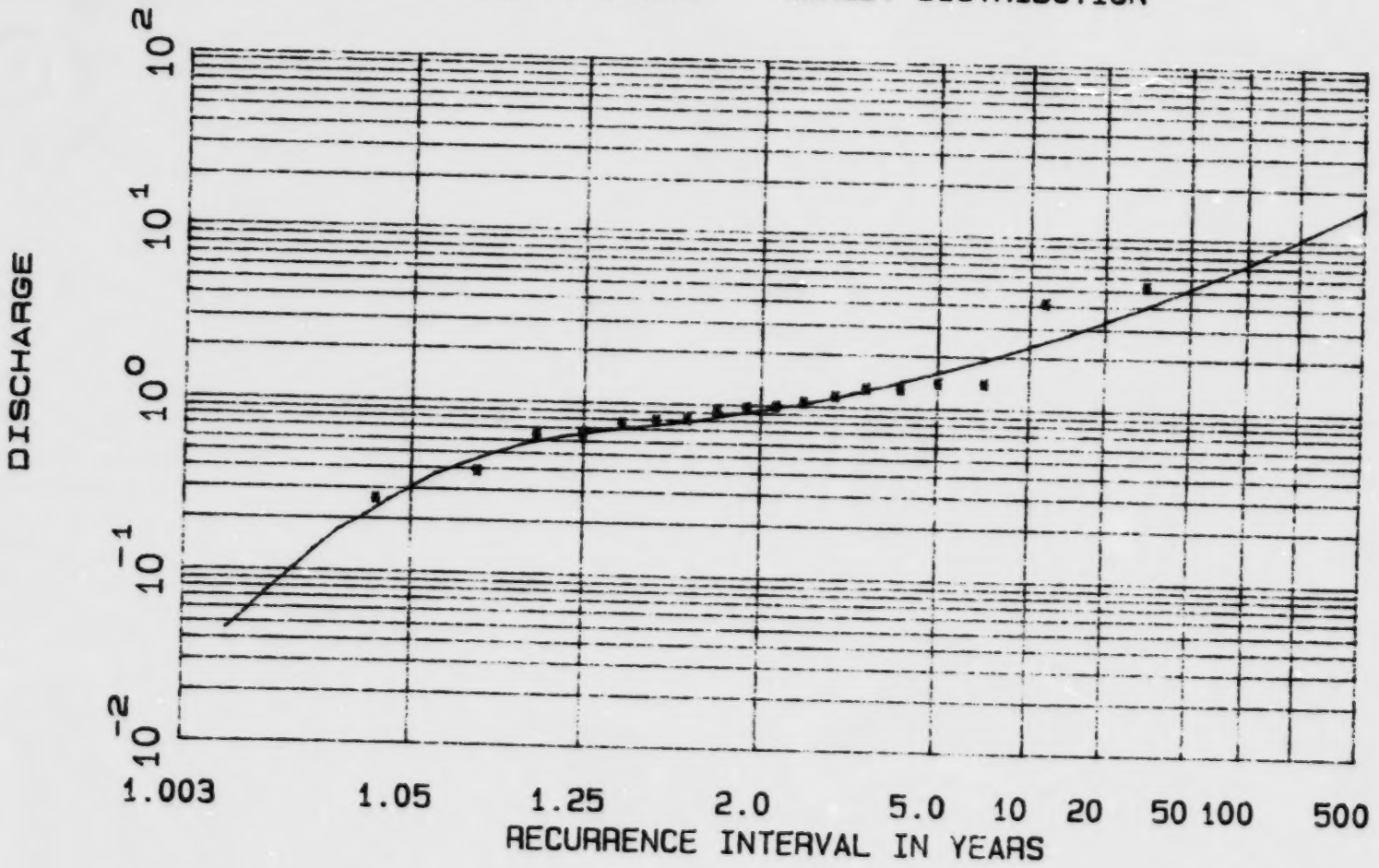
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.02
1.050	0.952	0.31
1.250	0.800	0.66
2.000	0.500	0.93
5.000	0.200	1.60
10.000	0.100	2.32
20.000	0.050	3.32
50.000	0.020	5.23
100.000	0.010	7.32
200.000	0.005	10.20
500.000	0.002	15.70

07SB913C

BAKER CK. NEAR YELLOWKNIFE & LOWER MARTIN

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=10HC003
WSC STATION NAME=BIG SMITH CREEK NEAR MACKENZIE HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(T) (YEARS)
5	1976	104.000	143.000	1	5.38	17.667
99	1977	61.100	112.000	2	15.69	6.375
6	1978	57.500	108.000	3	25.49	3.923
5	1979	93.400	104.000	4	35.29	2.833
6	1980	61.100	98.000	5	45.10	2.217
99	1981	88.000	95.400	6	54.90	1.821
5	1982	143.000	88.000	7	64.71	1.545
5	1983	112.000	61.100	8	74.51	1.342
5	1984	98.000	61.100	9	84.31	1.186
5	1985	108.000	57.500	10	94.10	1.062

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10HC003 BIG SMITH CREEK NEAR MACKENZIE HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	92.810	26.994	0.291	0.216	4.163
LN X SERIES	4.491	0.303	0.068	-0.316	3.418
LN(X-A) SERIES	5.337	0.129	0.024	-0.044	3.735

X(MIN)= 57.500
X(MAX)= 143.000
LOWER OUTLIER LIMIT OF X= 48.081

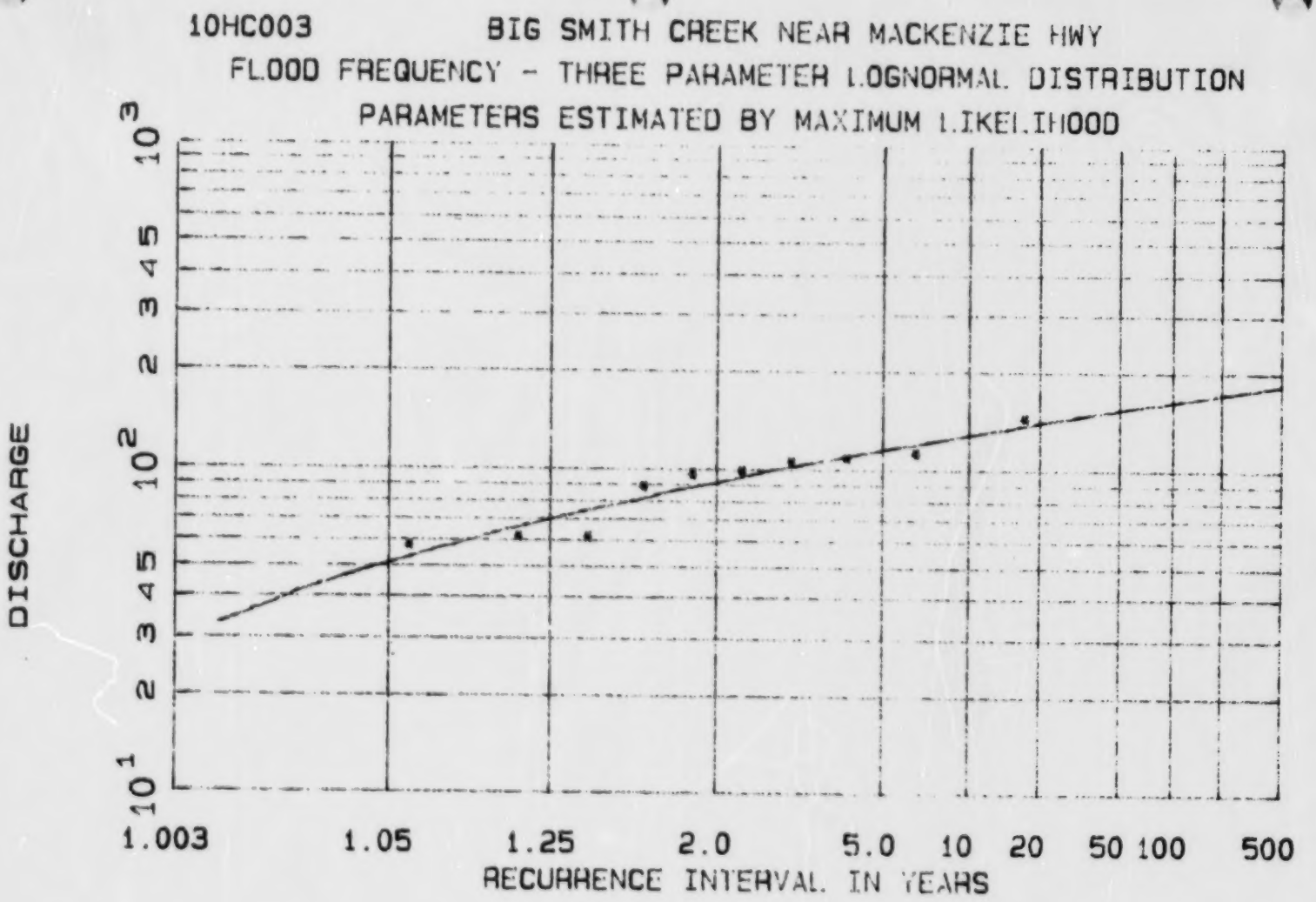
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -116.717 M= 5.337 S= 0.129

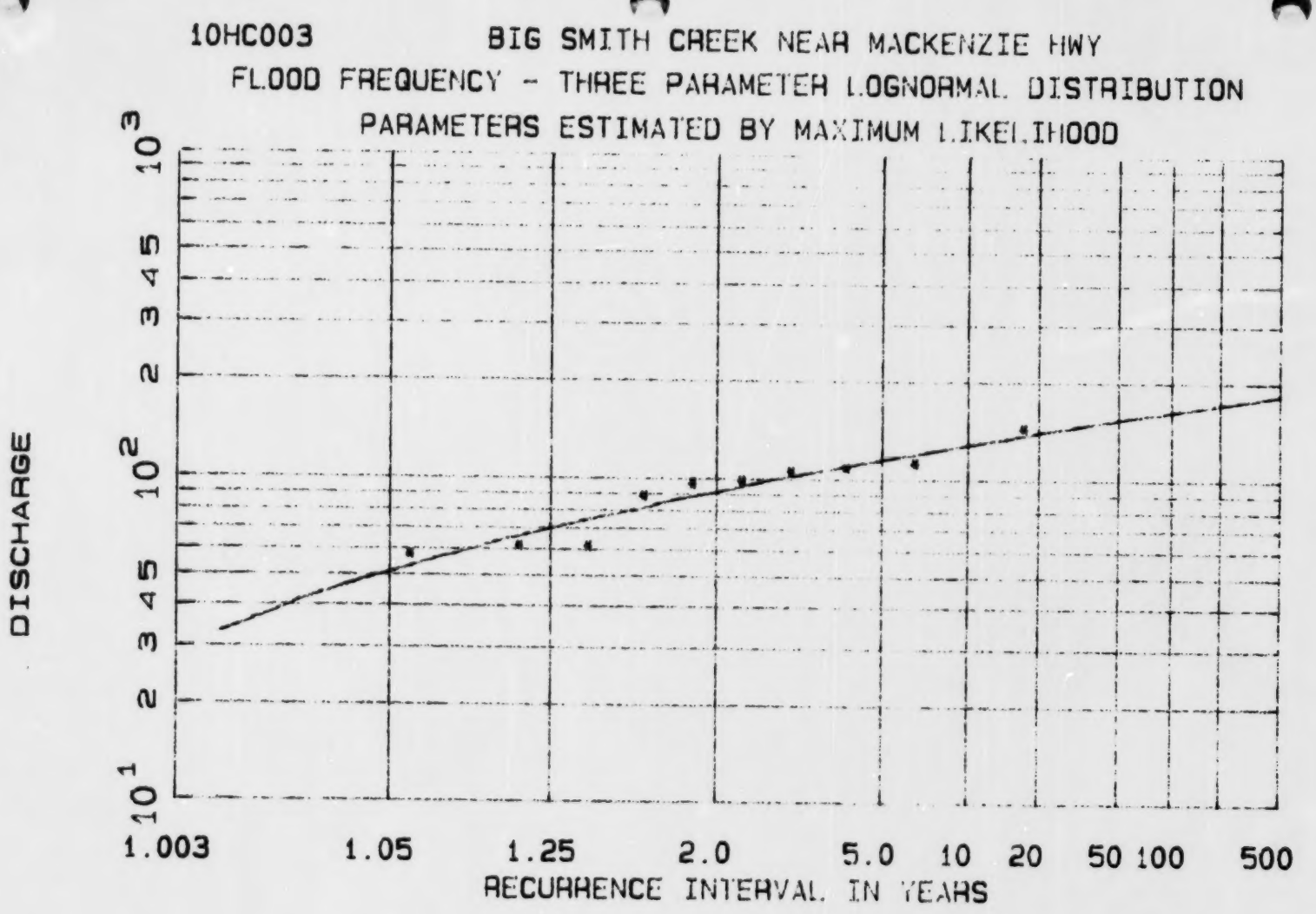
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	29.10
1.050	0.952	50.90
1.250	0.800	69.80
2.000	0.500	91.20
5.000	0.200	115.00
10.000	0.100	129.00
20.000	0.050	140.00
50.000	0.020	154.00
100.000	0.010	164.00
200.000	0.005	173.00
500.000	0.002	185.00


10HC003 BIG SMITH CREEK NEAR MACKENZIE HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^1 2 3 4 5 10^2 2 3 4 5 10^3
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10ED003
WSC STATION NAME=BIRCH RIVER AT THE FORT LIARD HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
9	1975	24.600	81.300	1	5.36	[illegible]
4	1976	60.600	60.600	2	14.29	[illegible]
9	1977	42.500	60.000	3	20.21	[illegible]
5	1978	19.800	47.100	4	32.14	[illegible]
5	1979	81.300	42.500	5	41.07	[illegible]
4	1980	5.860	37.200	6	50.00	[illegible]
8	1981	60.000	27.300	7	58.93	[illegible]
8	1982	47.100	24.600	8	67.86	[illegible]
5	1983	37.200	19.800	9	76.79	[illegible]
5	1984	9.440	9.440	10	85.71	[illegible]
9	1985	27.300	5.860	11	94.64	[illegible]


10HC003 BIG SMITH CREEK NEAR MACKENZIE HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^1 2 3 4 5 10^2 2 3 4 5 10^3
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10ED003
WSC STATION NAME=BIRCH RIVER AT THE FORT LIARD HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
3	1975	24.600	81.300	1	5.36	[illegible]
4	1976	60.600	60.600	2	14.29	[illegible]
5	1977	42.500	60.000	3	23.21	[illegible]
5	1978	19.800	47.100	4	32.14	[illegible]
5	1979	81.300	42.500	5	41.07	[illegible]
4	1980	5.860	37.200	6	50.00	[illegible]
5	1981	60.000	37.300	7	58.93	[illegible]
5	1982	47.100	24.600	8	67.86	[illegible]
5	1983	37.200	19.800	9	76.79	[illegible]
5	1984	9.440	9.440	10	85.71	[illegible]
5	1985	37.300	5.860	11	94.64	[illegible]

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10ED003 BIRCH RIVER AT THE FORT LIARD HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	37.791	23.328	0.618	0.399	3.670
LN X SERIES	3.393	0.810	0.239	-0.920	4.391
LN(X-A) SERIES	4.334	0.299	0.069	-0.113	2.857

X(MIN)= 5.860
X(MAX)= 81.300
LOWER OUTLIER LIMIT OF X= 5.492

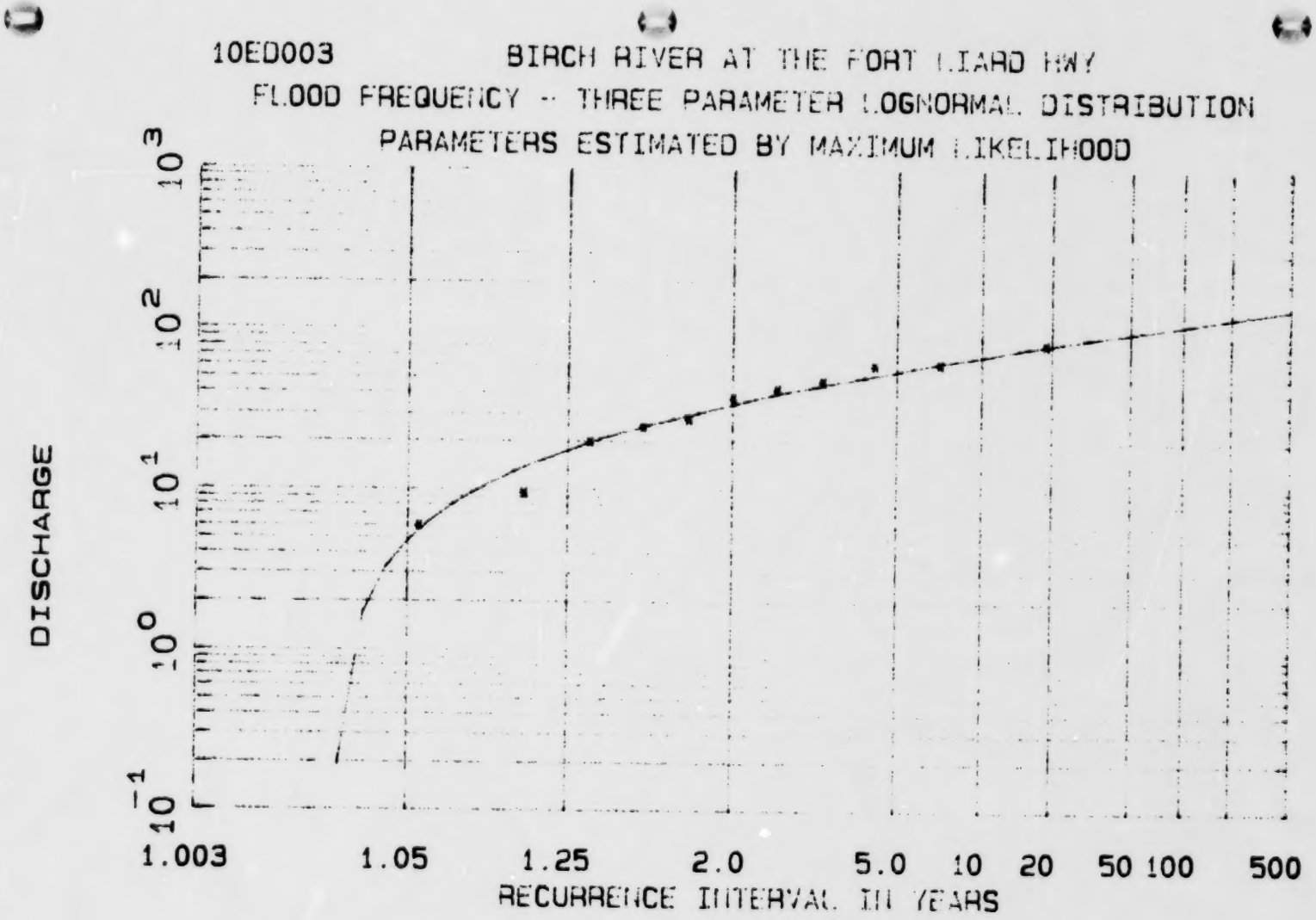
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -41.562 M= 4.334 S= 0.299

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.002	0.997	-
1.050	0.952	4.73
1.250	0.800	17.70
2.000	0.500	34.70
5.000	0.200	56.50
10.000	0.100	70.30
20.000	0.050	83.10
50.000	0.020	99.30
100.000	0.010	111.00
200.000	0.005	123.00
500.000	0.002	139.00


10ED003
BIRCH RIVER AT THE FORT LIARD HWY
FLOOD FREQUENCY -- THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10KA003
WSC STATION NAME=BOSWORTH CREEK AT NORMAN WELLS

MONTH	YEAR	DATA (CMS)	ORDERED (CMS)	RANK	FREQ. (%)	RET. PERIOD (YEARS)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
5	1976	4.530	15.300	1	5.88	17.000
5	1977	7.310	11.100	2	15.69	6.375
5	1978	4.130	10.800	3	25.49	3.923
99	1979	8.430	9.100	4	35.29	2.833
5	1980	9.100	8.430	5	45.10	2.217
99	1981	7.340	7.340	6	54.90	1.821
5	1982	10.800	7.310	7	64.71	1.545
5	1983	15.300	4.530	8	74.51	1.342
5	1984	2.740	4.130	9	84.31	1.186
5	1985	11.100	2.740	10	94.12	1.062

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10KA003 BOSWORTH CREEK AT NORMAN WELLS

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	8.078	3.766	0.466	0.433	4.419
LN X SERIES	1.977	0.523	0.264	-0.580	4.[illegible]
LN(X-A) SERIES	8.735	0.240	0.028	-0.075	3.877

X(MIN)= 2.740
X(MAX)= 15.300
LOWER OUTLIER LIMIT OF X= 2.492

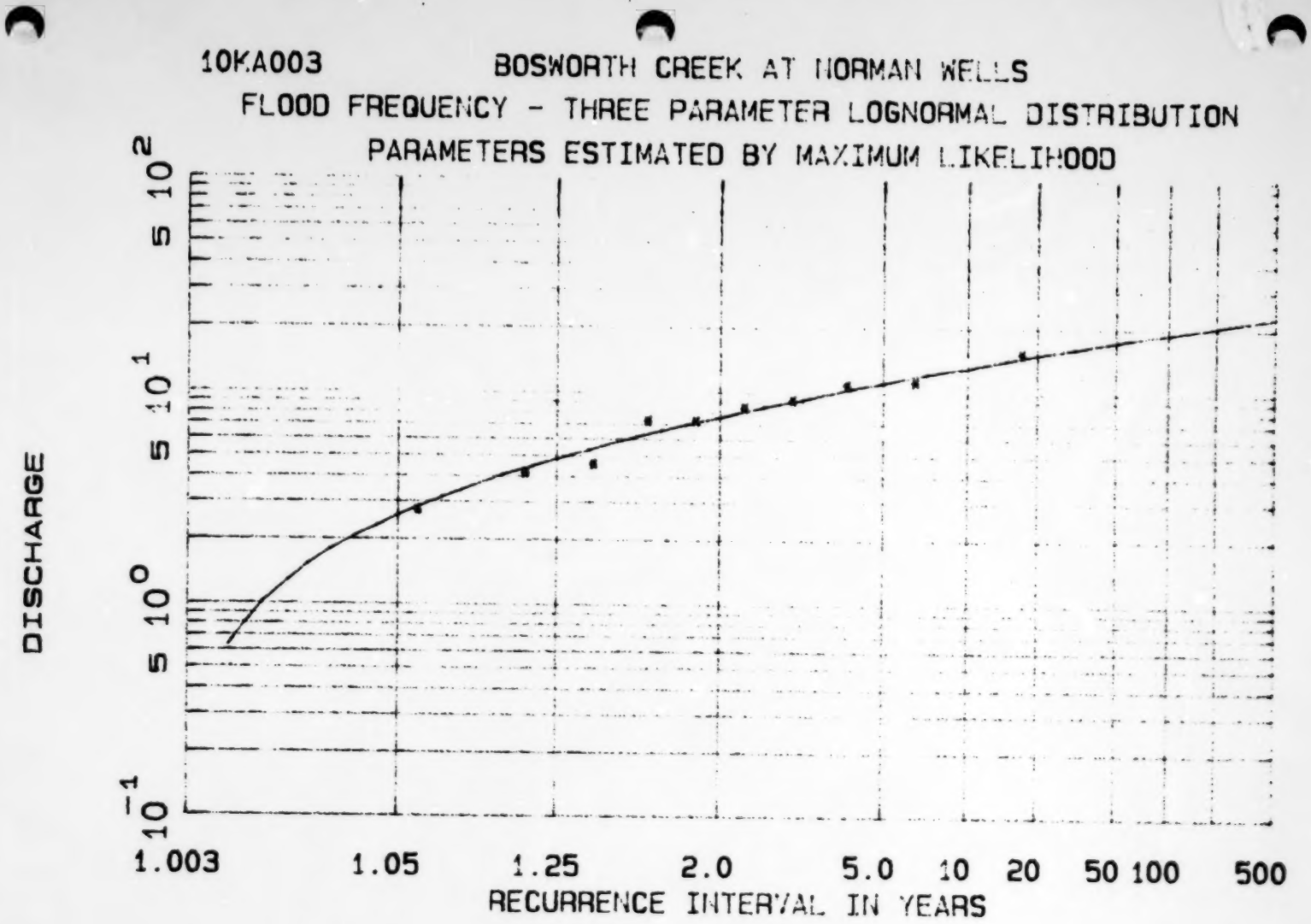
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -7.737 M= 8.735 S= 0.240

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.24
1.050	0.952	2.60
1.250	0.800	4.86
2.000	0.500	7.68
5.000	0.200	11.10
10.000	0.100	13.20
20.000	0.050	15.10
50.000	0.020	17.50
100.000	0.010	19.20
200.000	0.005	20.80
500.000	0.002	23.00


10KA003
BOSWORTH CREEK AT NORMAN WELLS
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^2
5 10^1
5 10^0
10^-1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07PA001
WSC STATION NAME=BUFFALO RIVER AT HWY 5

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1972	168.000	329.000	1	4.23	23.667
3	1973	205.000	278.000	2	11.27	8.875
5	1974	268.000	268.000	3	18.31	5.455
3	1975	197.000	232.000	4	25.35	3.944
3	1976	232.000	205.000	5	32.39	3.087
6	1977	141.000	197.000	6	39.44	2.536
10	1978	99.700	168.000	7	46.48	2.153
6	1979	278.000	163.000	8	53.52	1.869
99	1980	9.740	141.000	9	60.56	1.652
5	1981	82.100	130.000	10	67.61	1.479
5	1982	163.000	114.000	11	74.65	1.340
6	1983	114.000	99.700	12	81.69	1.224
7	1984	130.000	82.100	13	88.73	1.127
5	1985	329.000	9.740*	14	95.77	1.044

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07PA001 BUFFALO RIVER AT HWY 5

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	172.610	86.038	0.498	0.051	3.648
LN X SERIES	4.937	0.866	0.175	-2.427	11.167

X(MIN)= 9.740
X(MAX)= 329.000
LOWER OUTLIER LIMIT OF X= 20.533

TOTAL SAMPLE SIZE= 14
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

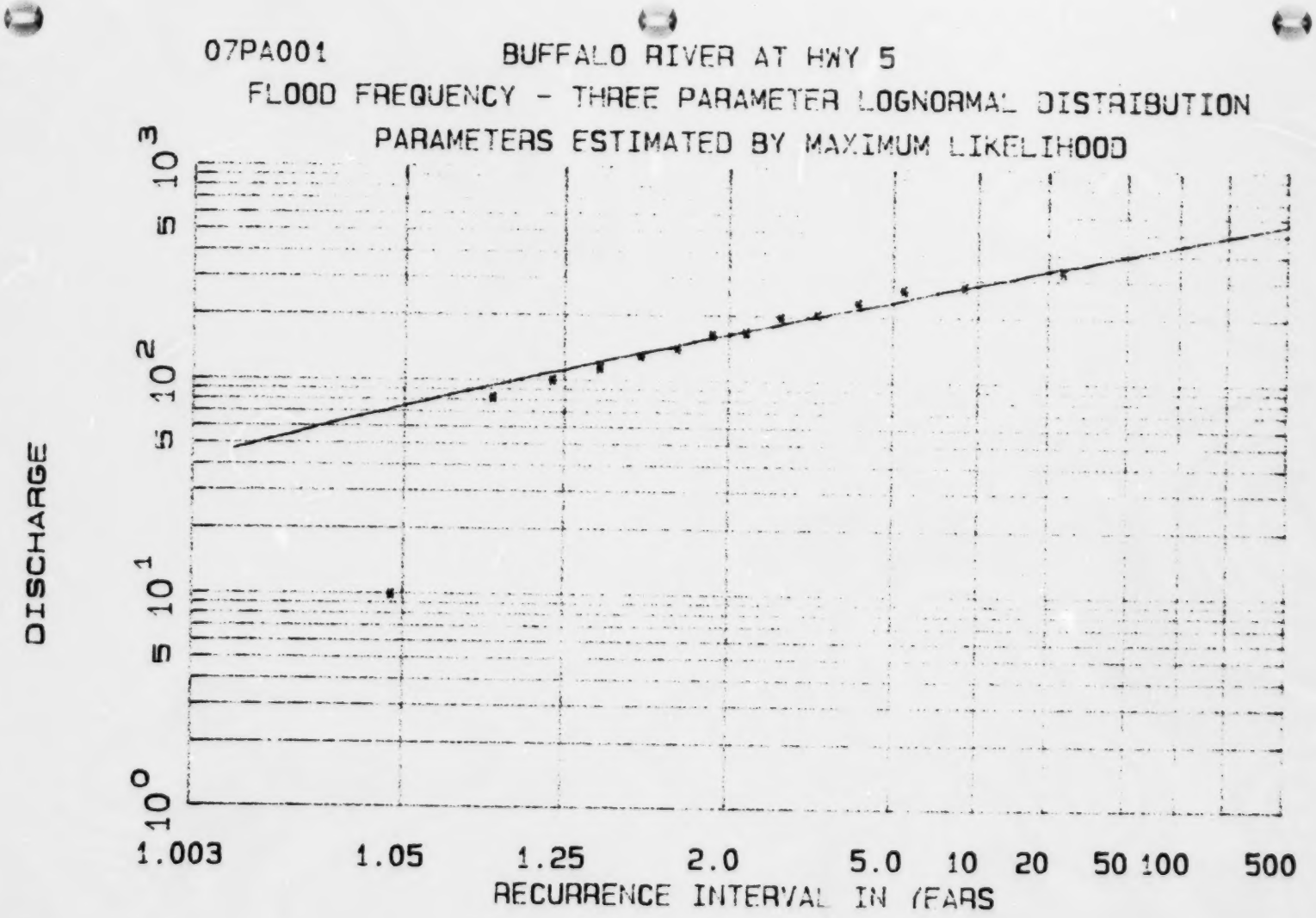
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	185.138	75.092	0.406	0.491	3.295
LN X SERIES	5.142	0.420	0.082	-0.168	3.084
LN(X-A) SERIES	5.262	0.373	0.071	-0.092	3.036

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= -20.187 M= 5.219 S= 0.398

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	41.70
1.050	0.952	74.90
1.250	0.800	112.00
2.000	0.500	165.00
5.000	0.200	238.00
10.000	0.100	288.00
20.000	0.050	336.00
50.000	0.020	398.00
100.000	0.010	446.00
200.000	0.005	495.00
500.000	0.002	561.00


07PA001
BUFFALO RIVER AT HWY 5
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07SB010
WSC STATION NAME=CAMERON RIVER BELOW REID LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1976	10.200	29.000	1	5.88	17.000
5	1977	1.660	24.300	2	15.69	6.375
8	1978	3.340	15.800	3	25.49	3.923
6	1979	5.970	15.100	4	35.29	2.833
6	1980	15.100	14.200	5	45.10	2.217
7	1981	3.250	10.200	6	54.90	1.821
7	1982	15.800	5.970	7	64.71	1.545
8	1983	14.200	3.340	8	74.51	1.342
7	1984	24.300	3.250	9	84.31	1.186
6	1985	29.000	1.660	10	94.12	1.062

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07SB010 CAMERON RIVER BELOW REID LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	12.282	9.228	0.751	0.631	3.810
LN X SERIES	2.169	0.955	0.440	-0.516	3.387
LN(X-A) SERIES	2.217	0.909	0.410	-0.463	3.294

X(MIN)= 1.660 TOTAL SAMPLE SIZE= 10
X(MAX)= 29.000 NO. OF LOW OUTLIERS= 0
LOWER OUTLIER LIMIT OF X= 1.251 NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -0.291 M= 2.217 S= 0.909

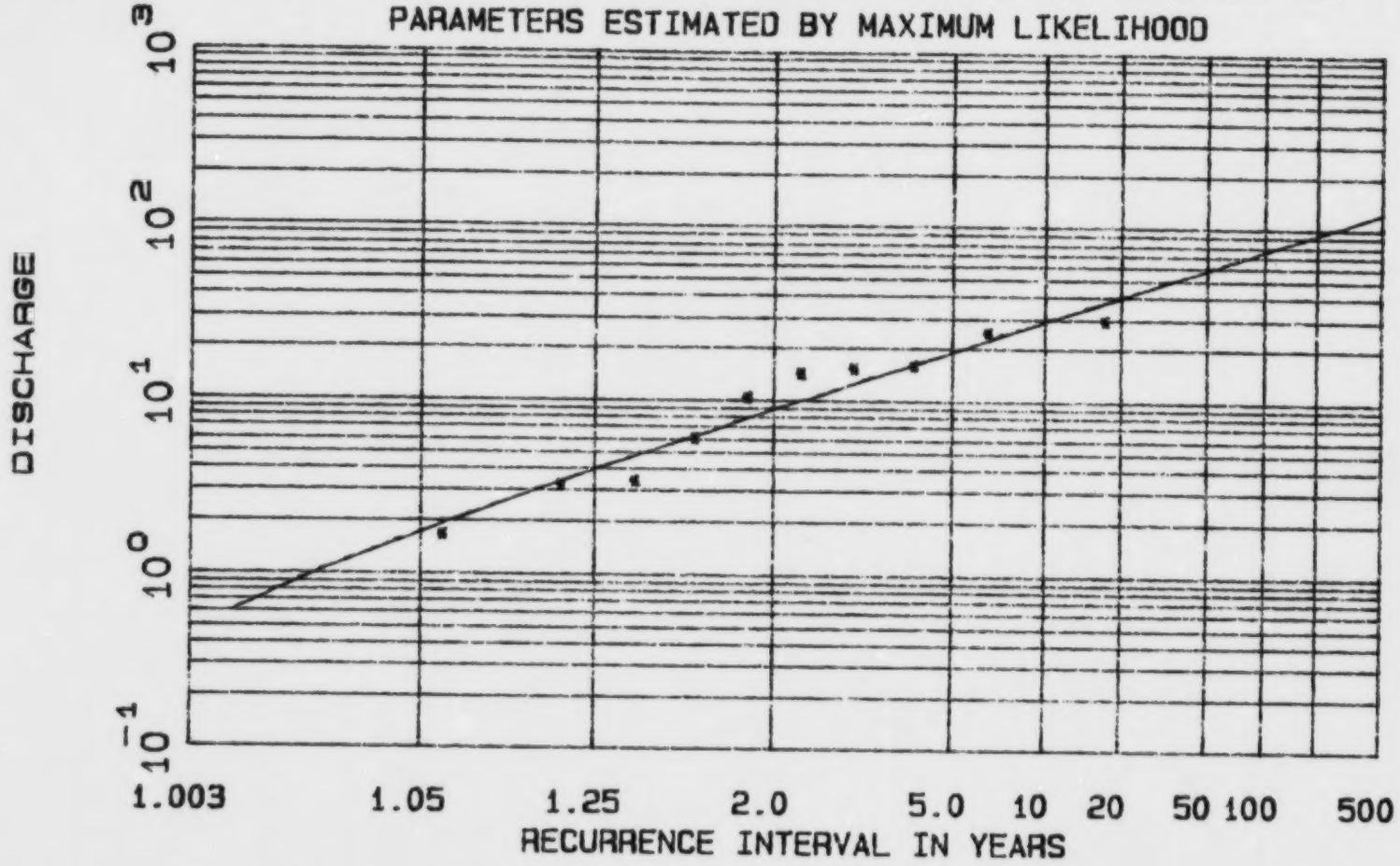
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.46
1.050	0.952	1.72
1.250	0.800	3.98
2.000	0.500	8.89
5.000	0.200	19.40
10.000	0.100	29.20
20.000	0.050	40.70
50.000	0.020	59.10
100.000	0.010	75.80
200.000	0.005	95.20
500.000	0.002	125.00

07SB010 CAMERON RIVER BELOW REID LAKE

FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
07SB010 CAMERON RIVER BELOW REID LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	12.282	9.228	0.751	0.631	3.810
LN X SERIES	2.169	0.955	0.440	-0.516	3.387

X(MIN)= 1.660
X(MAX)= 29.000
LOWER OUTLIER LIMIT OF X= 1.251

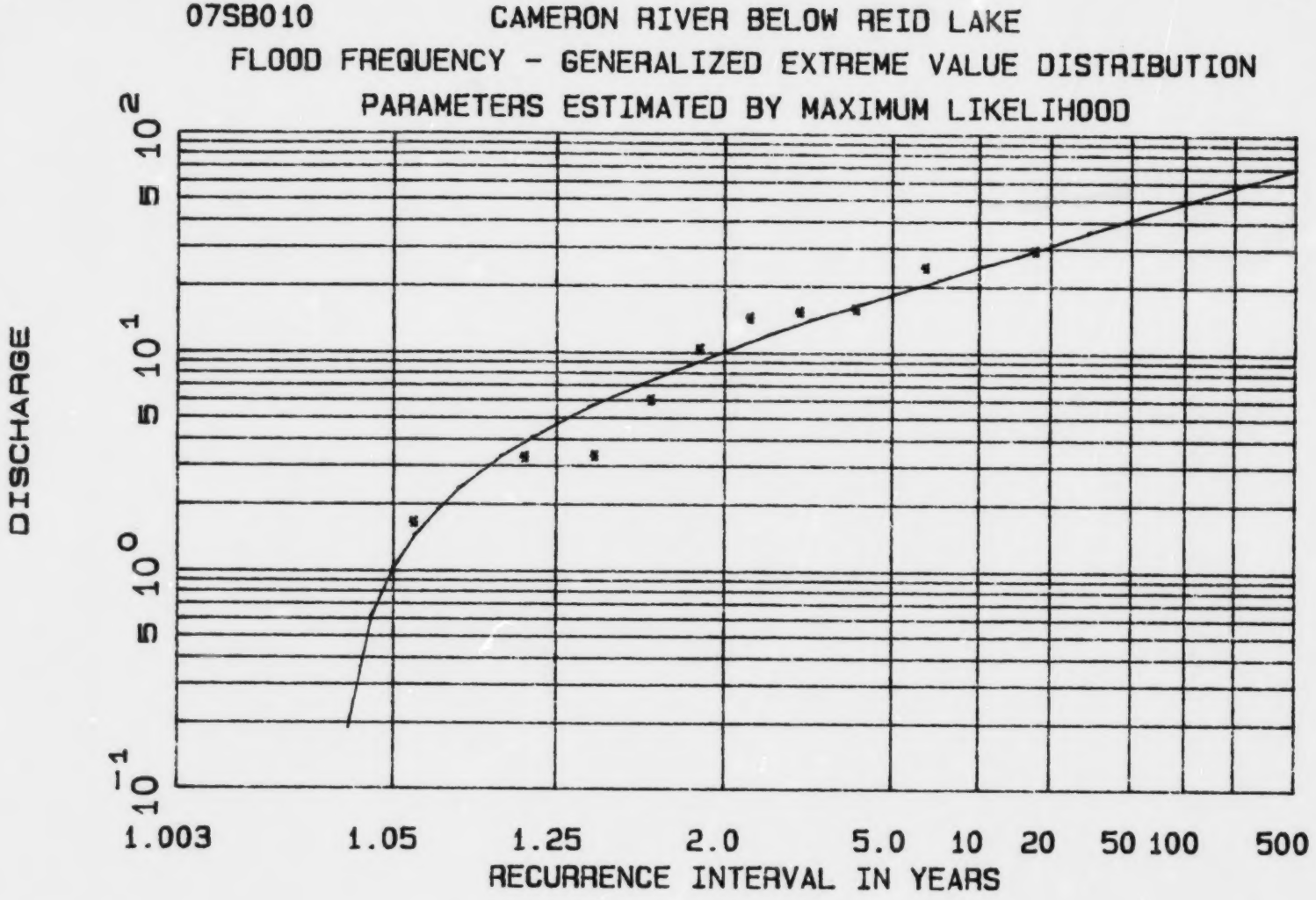
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

GEV PARAMETERS: U= 7.67 A= 6.446 K= -0.137

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	1.02
1.250	0.800	4.70
2.000	0.500	10.10
5.000	0.200	18.40
10.000	0.100	24.70
20.000	0.050	31.30
50.000	0.020	40.90
100.000	0.010	49.00
200.000	0.005	57.80
500.000	0.002	70.80


07SB010 CAMERON RIVER BELOW REID LAKE
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^2
5 10^1
5 10^0
10^-1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
07SB010 CAMERON RIVER BELOW REID LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	12.282	9.228	0.751	0.631	3.810
LN X SERIES	2.169	0.955	0.440	-0.516	3.387

X(MIN)= 1.660
X(MAX)= 29.000
LOWER OUTLIER LIMIT OF X= 1.251

TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT M= 354.2
LP3 PARAMETERS: A=-0.2462 B= 15.03 LOG(M)= 5.870
M = 354.2

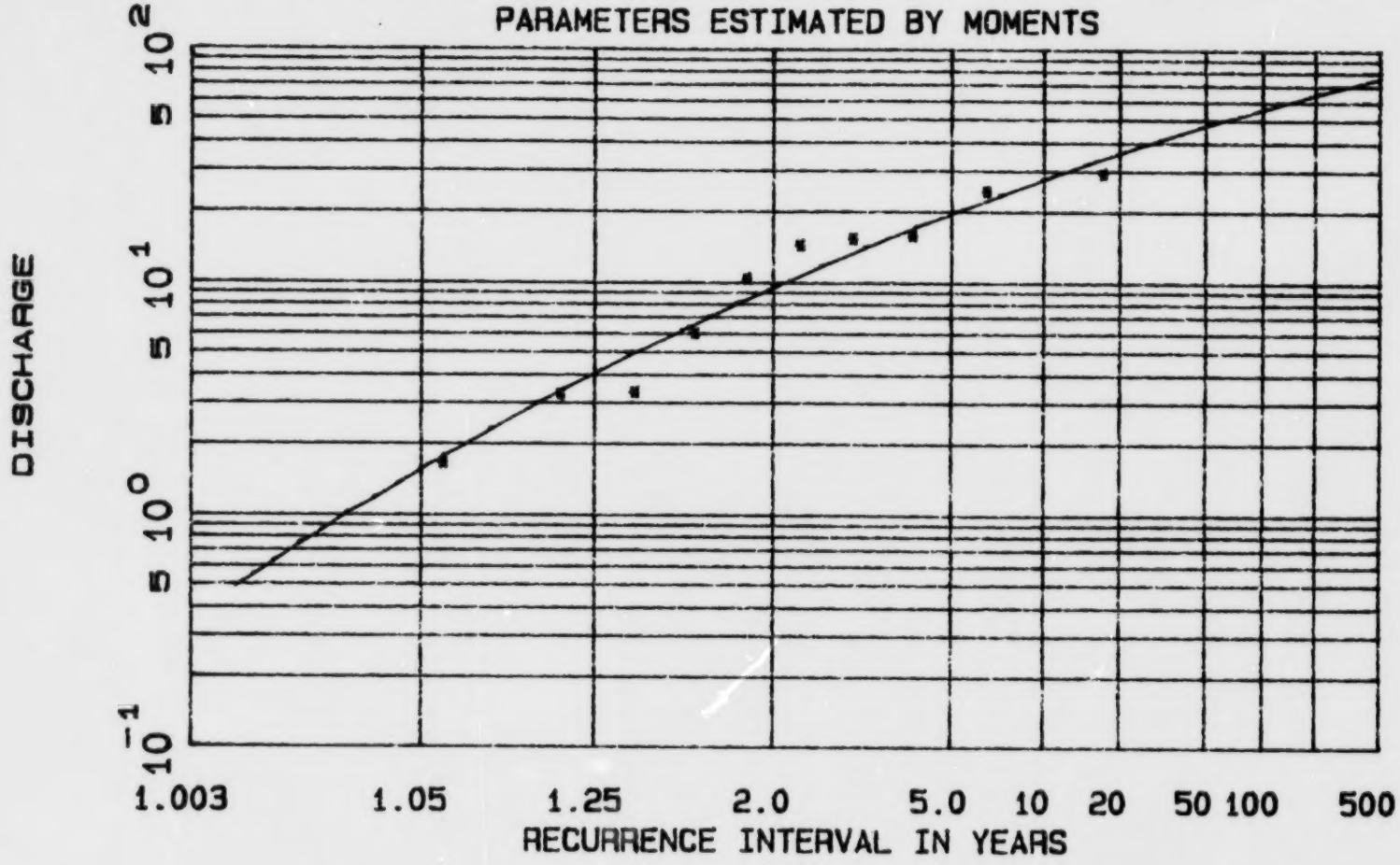
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.37
1.050	0.952	1.56
1.250	0.800	4.05
2.000	0.500	9.49
5.000	0.200	19.80
10.000	0.100	27.80
20.000	0.050	36.10
50.000	0.020	47.40
100.000	0.010	56.10
200.000	0.005	64.90
500.000	0.002	76.60

07SB010 CAMERON RIVER BELOW REID LAKE

FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
07SB010 CAMERON RIVER BELOW REID LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	12.282	9.228	0.751	0.631	3.810
LN X SERIES	2.169	0.955	0.440	-0.516	3.387

X(MIN)= 1.660
X(MAX)= 29.000
LOWER OUTLIER LIMIT OF X= 1.251

TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B. ASSUMING M TO BE NON-ZERO.

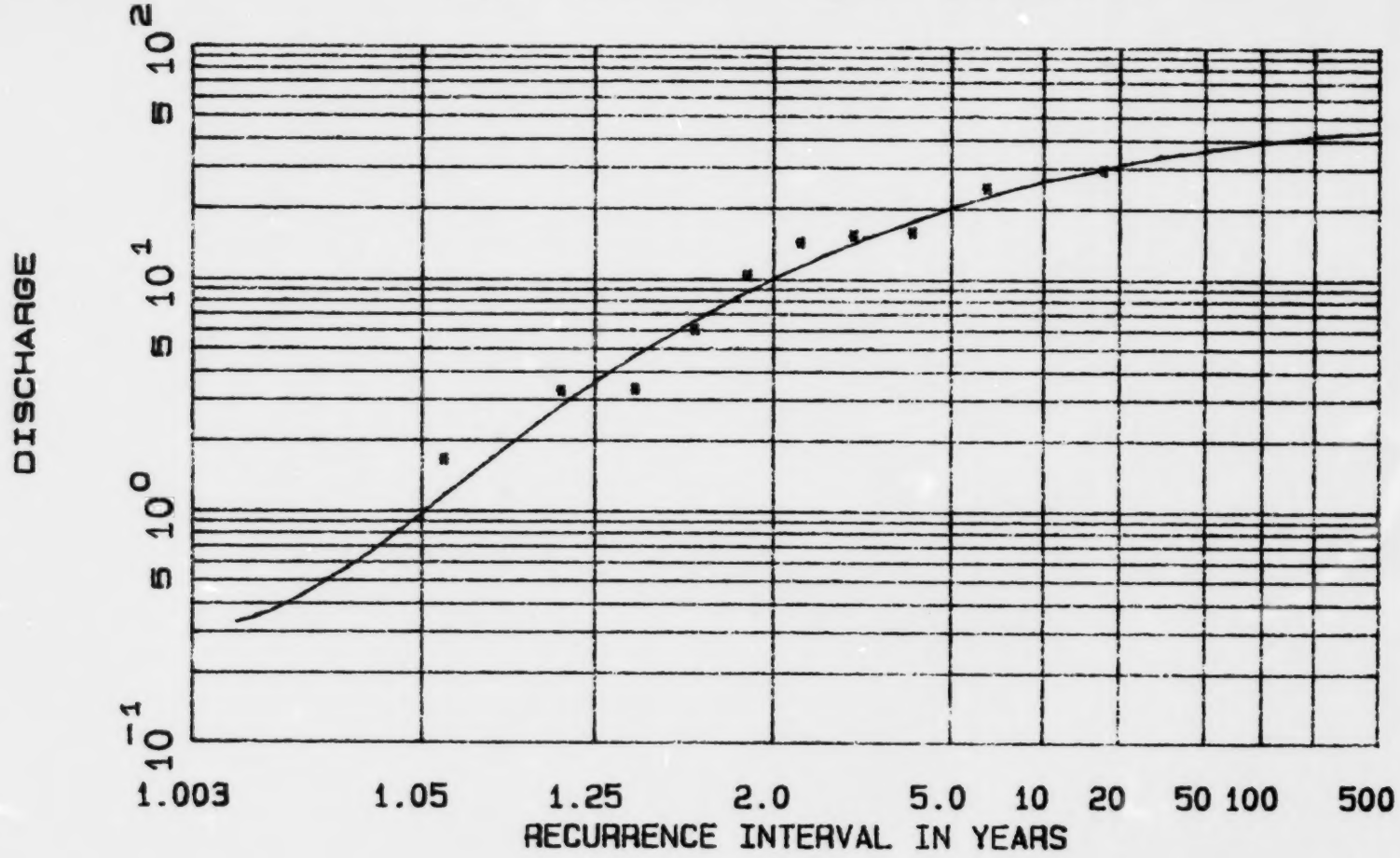
M= 0.263 A= -0.064 B= 45.03 C= -51.664 D=-0.305
DISTRIBUTION IS UPPER BOUNDED AT E= 0.5186E+02

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.30
1.050	0.952	0.97
1.250	0.800	3.60
2.000	0.500	10.10
5.000	0.200	20.30
10.000	0.100	26.30
20.000	0.050	31.20
50.000	0.020	36.20
100.000	0.010	39.20
200.000	0.005	41.60
500.000	0.002	44.10

07SB010 CAMERON RIVER BELOW REID LAKE

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=10JA002
WSC STATION NAME=CAMSELL RIVER AT OUTLET OF CLUT LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1965	104.000	228.000	1	2.83	35.333
7	1966	98.800	182.000	2	7.55	13.250
10	1967	108.000	171.000	3	12.26	8.154
7	1968	116.000	160.000	4	16.98	5.889
9	1969	108.000	151.000	5	21.70	4.609
11	1970	113.000	135.000	6	26.42	3.786
7	1971	182.000	134.000	7	31.13	3.212
7	1972	134.000	126.000	8	35.85	2.789
6	1973	114.000	116.000	9	40.57	2.465
8	1974	107.000	114.000	10	45.28	2.208
7	1975	171.000	113.000	11	50.00	2.000
7	1976	76.200	108.000	12	54.72	1.828
7	1977	94.000	108.000	13	59.43	1.683
7	1978	73.900	107.000	14	64.15	1.559
7	1979	92.100	107.000	15	68.87	1.452
7	1980	135.000	104.000	16	73.58	1.359
7	1981	107.000	98.800	17	78.30	1.277
7	1982	126.000	94.000	18	83.02	1.205
10	1983	160.000	92.100	19	87.74	1.140
9	1984	228.000	76.200	20	92.45	1.082
7	1985	151.000	73.900	21	97.17	1.029

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10JA002 CAMSELL RIVER AT OUTLET OF CLUT LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	123.762	37.256	0.301	1.254	5.286
LN X SERIES	4.780	0.279	0.058	0.508	3.780
LN(X-A) SERIES	4.243	0.467	0.110	-0.020	3.711

X(MIN)= 73.900
X(MAX)= 228.000
LOWER OUTLIER LIMIT OF X= 60.810

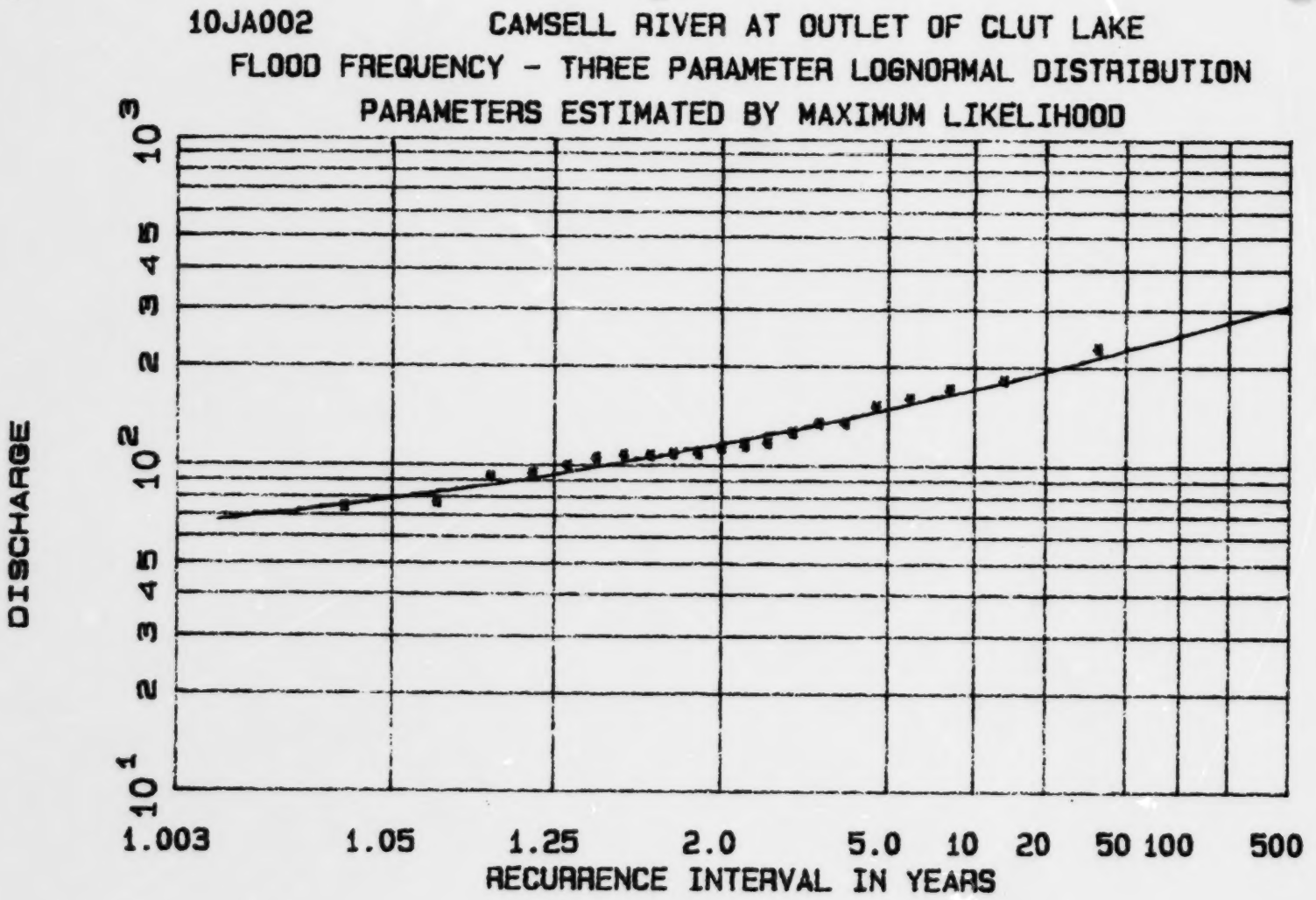
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 46.570 M= 4.243 S= 0.467

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	65.90
1.050	0.952	78.50
1.250	0.800	93.60
2.000	0.500	116.00
5.000	0.200	150.00
10.000	0.100	173.00
20.000	0.050	197.00
50.000	0.020	228.00
100.000	0.010	253.00
200.000	0.005	278.00
500.000	0.002	313.00


10JA002 CAMSELL RIVER AT OUTLET OF CLUT LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10LC007
WSC STATION NAME=CARIBOU CREEK ABOVE DEMPSTER HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1975	59.500	65.000	1	5.36	18.667
6	1976	11.800	59.500	2	14.29	7.000
5	1977	51.000	53.000	3	23.21	4.308
6	1978	17.000	51.000	4	32.14	3.111
5	1979	11.700	35.000	5	41.07	2.435
5	1980	65.000	17.000	6	50.00	2.000
7	1981	7.420	12.000	7	58.93	1.697
5	1982	53.000	11.800	8	67.86	1.474
5	1983	35.000	11.700	9	76.79	1.302
5	1984	12.000	9.900	10	85.71	1.167
5	1985	9.900	7.420	11	94.64	1.057

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	30.302	22.721	0.750	0.475	2.376
LN X SERIES	3.115	0.830	0.267	0.132	2.188
LN(X-A) SERIES	2.443	1.469	0.602	-0.552	3.690

X(MIN)= 7.420
X(MAX)= 65.000
LOWER OUTLIER LIMIT OF X= 3.979

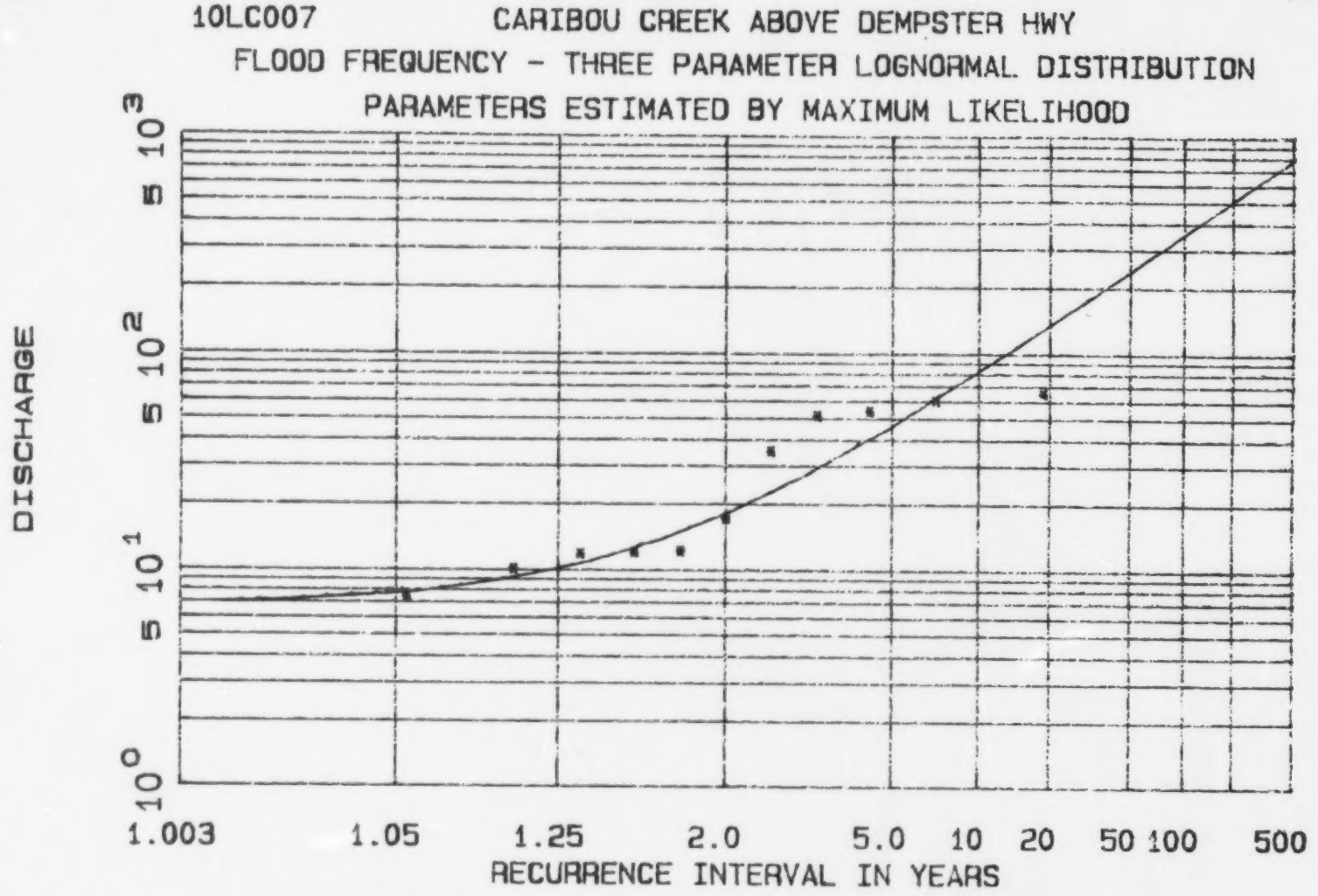
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 6.779 M= 2.443 S= 1.469

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	6.98
1.050	0.952	7.77
1.250	0.800	10.10
2.000	0.500	18.30
5.000	0.200	46.40
10.000	0.100	82.40
20.000	0.050	136.00
50.000	0.020	242.00
100.000	0.010	358.00
200.000	0.005	513.00
500.000	0.002	797.00


10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	30.302	22.721	0.750	0.475	2.376
LN X SERIES	3.115	0.830	0.267	0.132	2.188

X(MIN)= 7.420
X(MAX)= 65.000
LOWER OUTLIER LIMIT OF X= 3.979

TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT (U+A/K)= 0.1683E+03
GEV PARAMETERS: U= 20.94 A= 20.594 K= 0.140

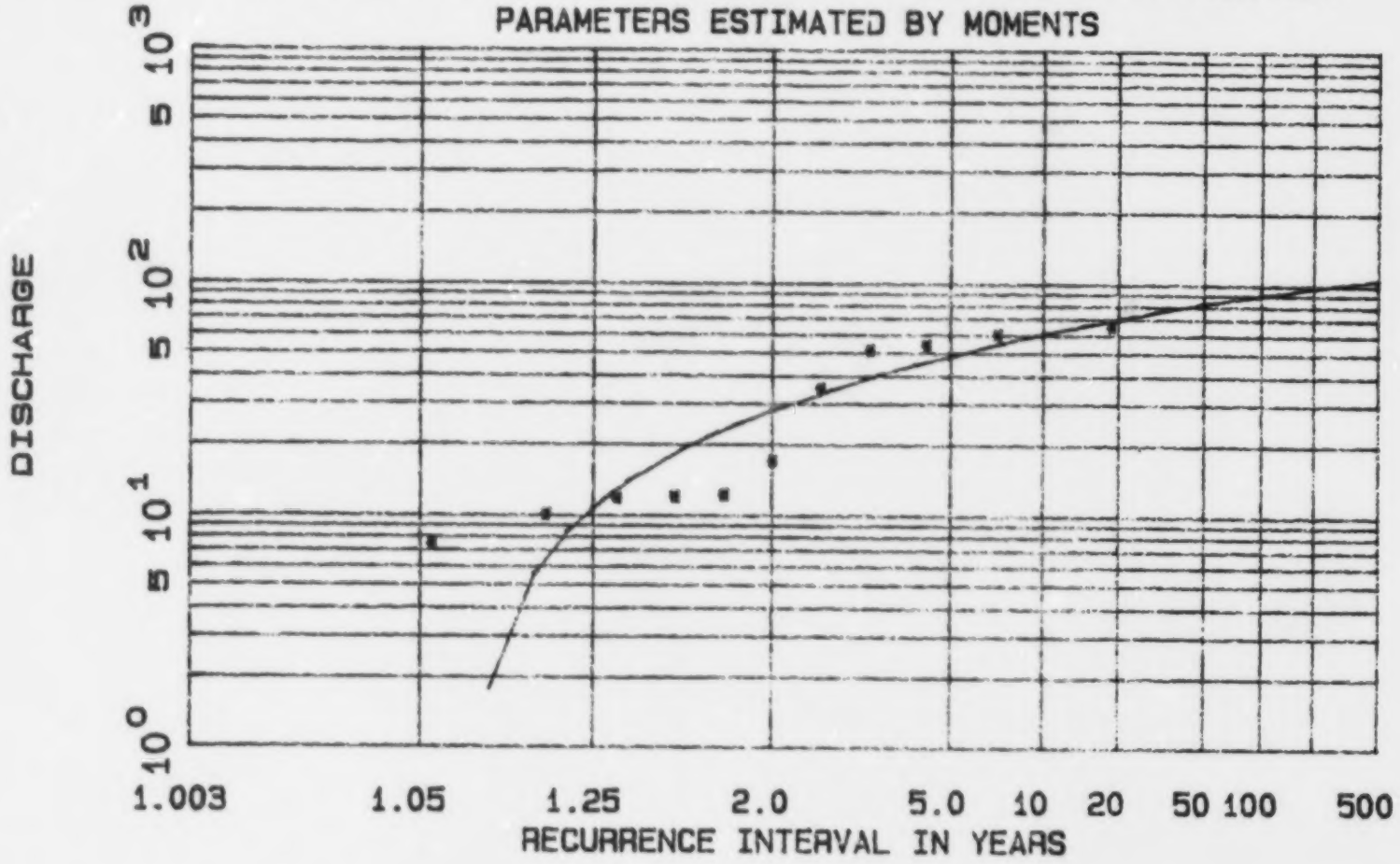
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	10.80
2.000	0.500	28.30
5.000	0.200	48.80
10.000	0.100	60.70
20.000	0.050	71.00
50.000	0.020	82.90
100.000	0.010	90.80
200.000	0.005	98.00
500.000	0.002	106.00

10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	30.302	22.721	0.750	0.475	2.376
LN X SERIES	3.115	0.830	0.267	0.132	2.188

X(MIN)= 7.420
X(MAX)= 65.000
LOWER OUTLIER LIMIT OF X= 3.979

TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

LP3 PARAMETERS: A= 0.5474E-01 B= 230.1 LOG(M)= -9.478
M = 0.7653E-04

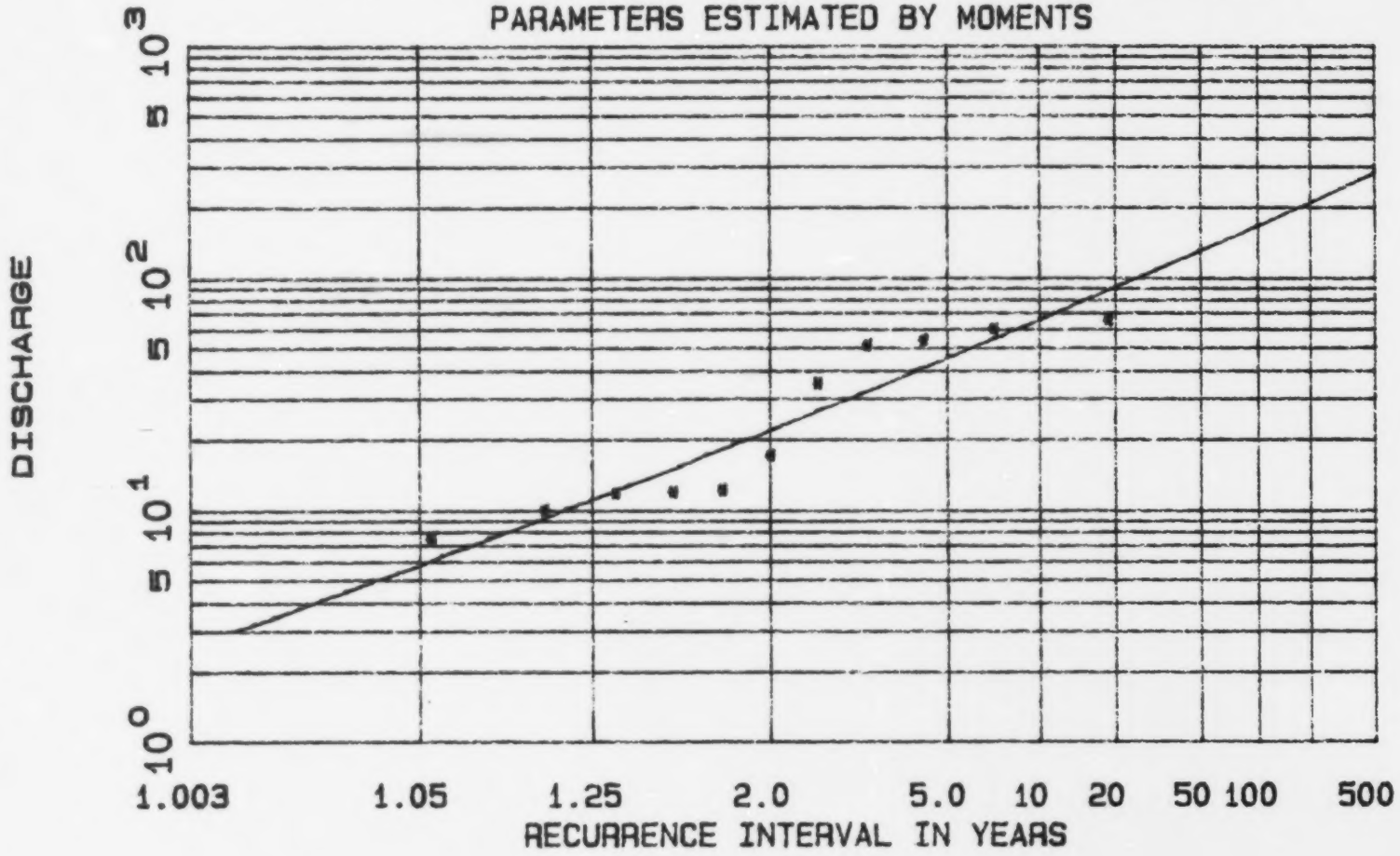
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	2.59
1.050	0.952	5.83
1.250	0.800	11.10
2.000	0.500	22.10
5.000	0.200	45.00
10.000	0.100	66.00
20.000	0.050	91.00
50.000	0.020	131.00
100.000	0.010	168.00
200.000	0.005	212.00
500.000	0.002	281.00

10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10LC007 CARIBOU CREEK ABOVE DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	30.302	22.721	0.750	0.475	2.376
LN X SERIES	3.115	0.830	0.267	0.132	2.188

X(MIN)= 7.420 TOTAL SAMPLE SIZE= 11
X(MAX)= 65.000 NO. OF LOW OUTLIERS= 0
LOWER OUTLIER LIMIT OF X= 3.979 NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B. ASSUMING M TO BE ZERO.

M= 0.000 A= 2.507 B= 45.03 C= -153.564 D=-0.222
DISTRIBUTION IS UPPER BOUNDED AT E= 0.1561E+03

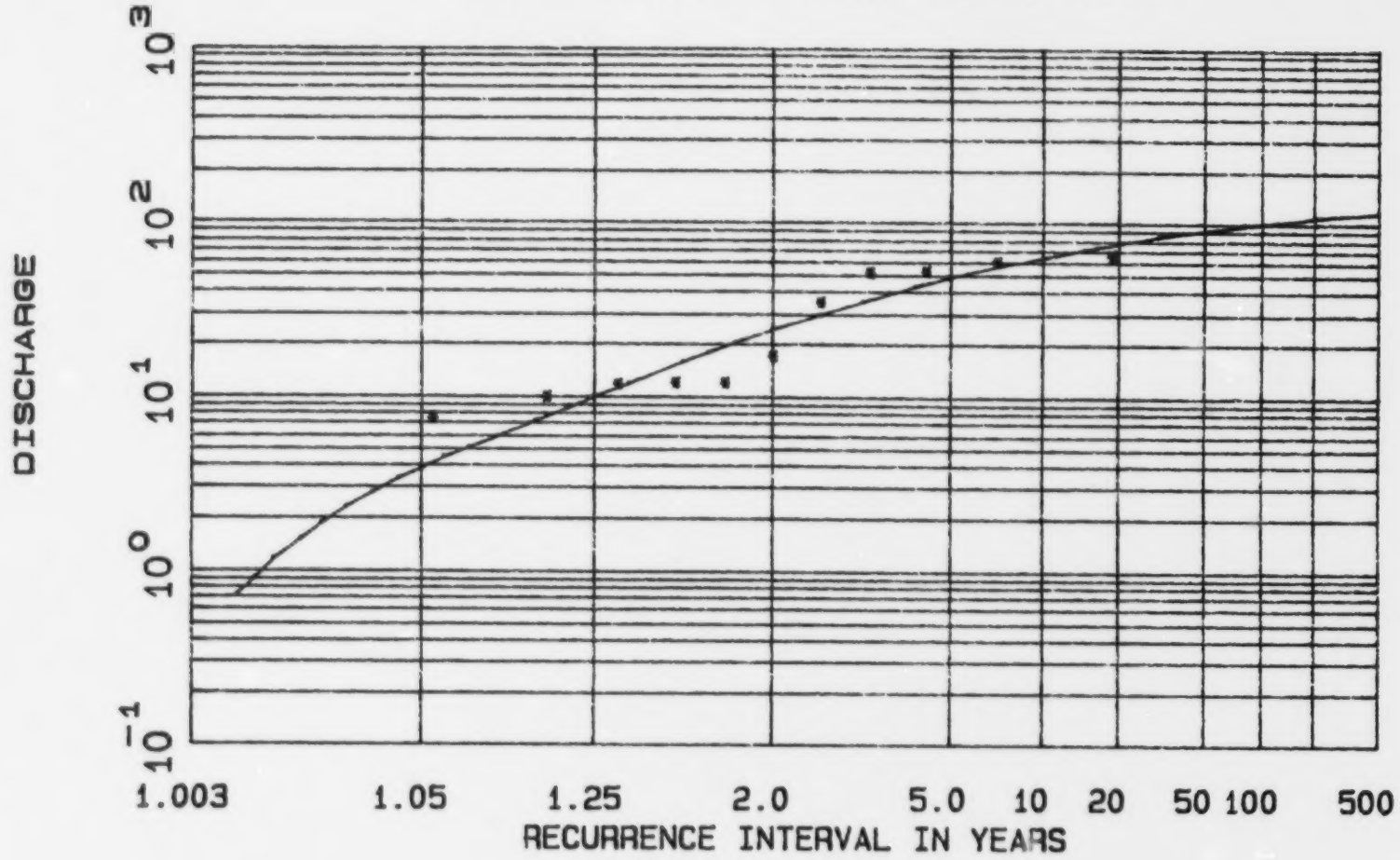
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	0.42
1.050	0.952	3.88
1.250	0.800	9.91
2.000	0.500	24.40
5.000	0.200	48.60
10.000	0.100	63.90
20.000	0.050	77.00
50.000	0.020	91.50
100.000	0.010	101.00
200.000	0.005	109.00
500.000	0.002	117.00

10LC007

CARIBOU CREEK ABOVE DEMPSTER HWY

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=10PB001
WSC STATION NAME=COPPERMINE RIVER AT OUTLET OF POINT LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1966	259.000	533.000*	1	2.97	33.667
8	1967	275.000	311.000	2	7.92	12.625
7	1968	238.000	275.000	3	12.87	7.769
9	1969	230.000	270.000	4	17.82	5.611
7	1970	191.000	266.000	5	22.77	4.391
7	1971	241.000	259.000	6	27.72	3.607
7	1972	259.000	259.000	7	32.67	3.061
7	1973	185.000	241.000	8	37.62	2.658
8	1974	193.000	238.000	9	42.57	2.349
7	1975	266.000	230.000	10	47.52	2.104
7	1976	174.000	219.000	11	52.48	1.906
7	1977	218.000	218.000	12	57.43	1.741
8	1978	170.000	210.000	13	62.38	1.603
7	1979	210.000	193.000	14	67.33	1.485
7	1980	122.000	191.000	15	72.28	1.384
7	1981	172.000	185.000	16	77.23	1.295
7	1982	219.000	174.000	17	82.18	1.217
8	1983	270.000	172.000	18	87.13	1.148
7	1984	533.000	170.000	19	92.08	1.086
8	1985	311.000	122.000	20	97.03	1.031

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	236.800	83.217	0.351	2.420	12.013
LN X SERIES	5.421	0.298	0.055	0.820	6.613
LN(X-A) SERIES	5.084	0.410	0.081	0.215	6.023

X(MIN)= 122.000
X(MAX)= 533.000
LOWER OUTLIER LIMIT OF X= 111.235

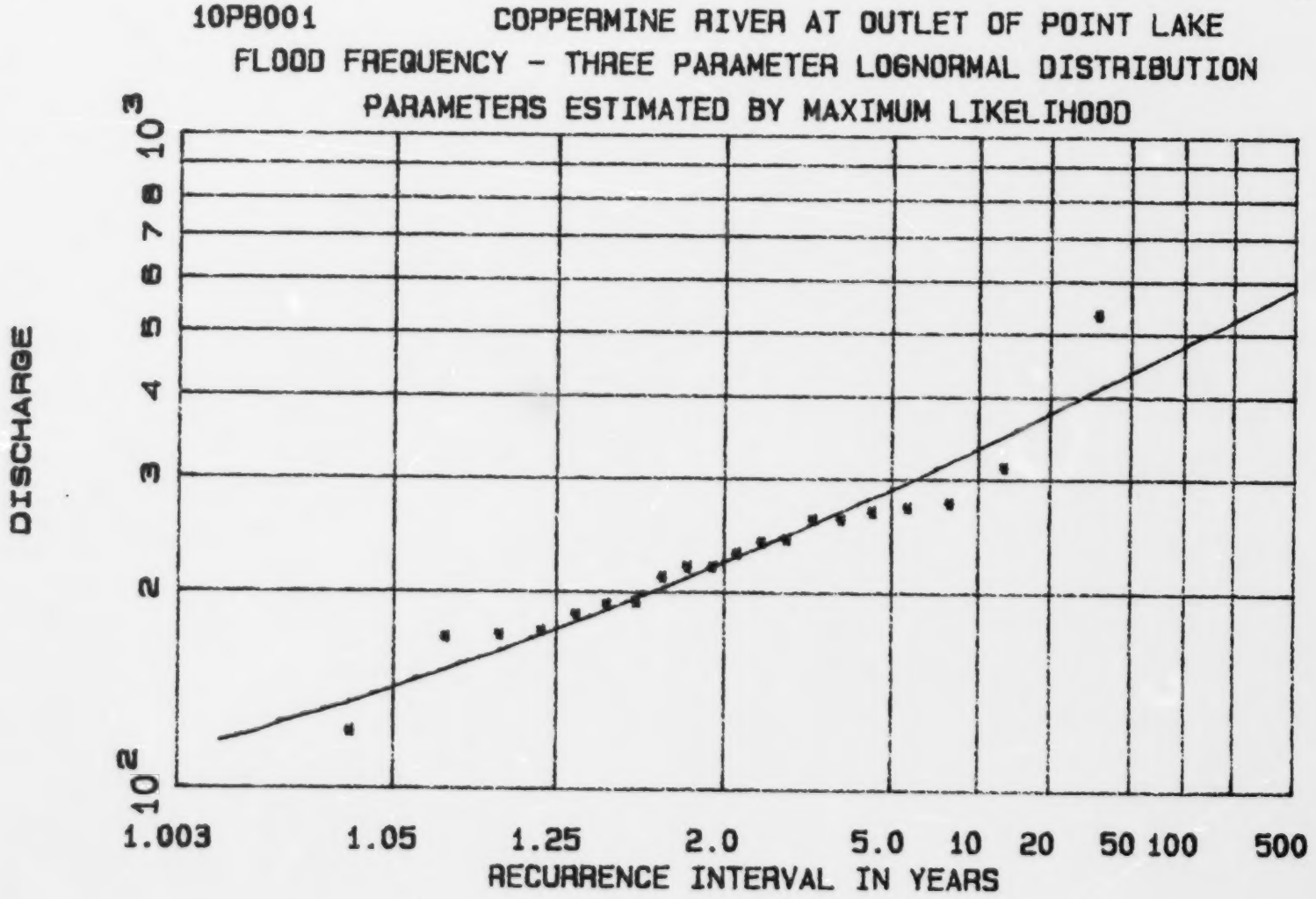
TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 61.234 M= 5.084 S= 0.410

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	114.00
1.050	0.952	143.00
1.250	0.800	176.00
2.000	0.500	223.00
5.000	0.200	289.00
10.000	0.100	334.00
20.000	0.050	378.00
50.000	0.020	436.00
100.000	0.010	480.00
200.000	0.005	526.00
500.000	0.002	587.00


10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^2 2 3 4 5 6 7 8 10^3
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	236.800	83.217	0.351	2.420	12.013
LN X SERIES	5.421	0.298	0.055	0.820	6.613

X(MIN)= 122.000
X(MAX)= 533.000
LOWER OUTLIER LIMIT OF X= 111.235

TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

GEV PARAMETERS: U= 198.67 A= 51.533 K= -0.143

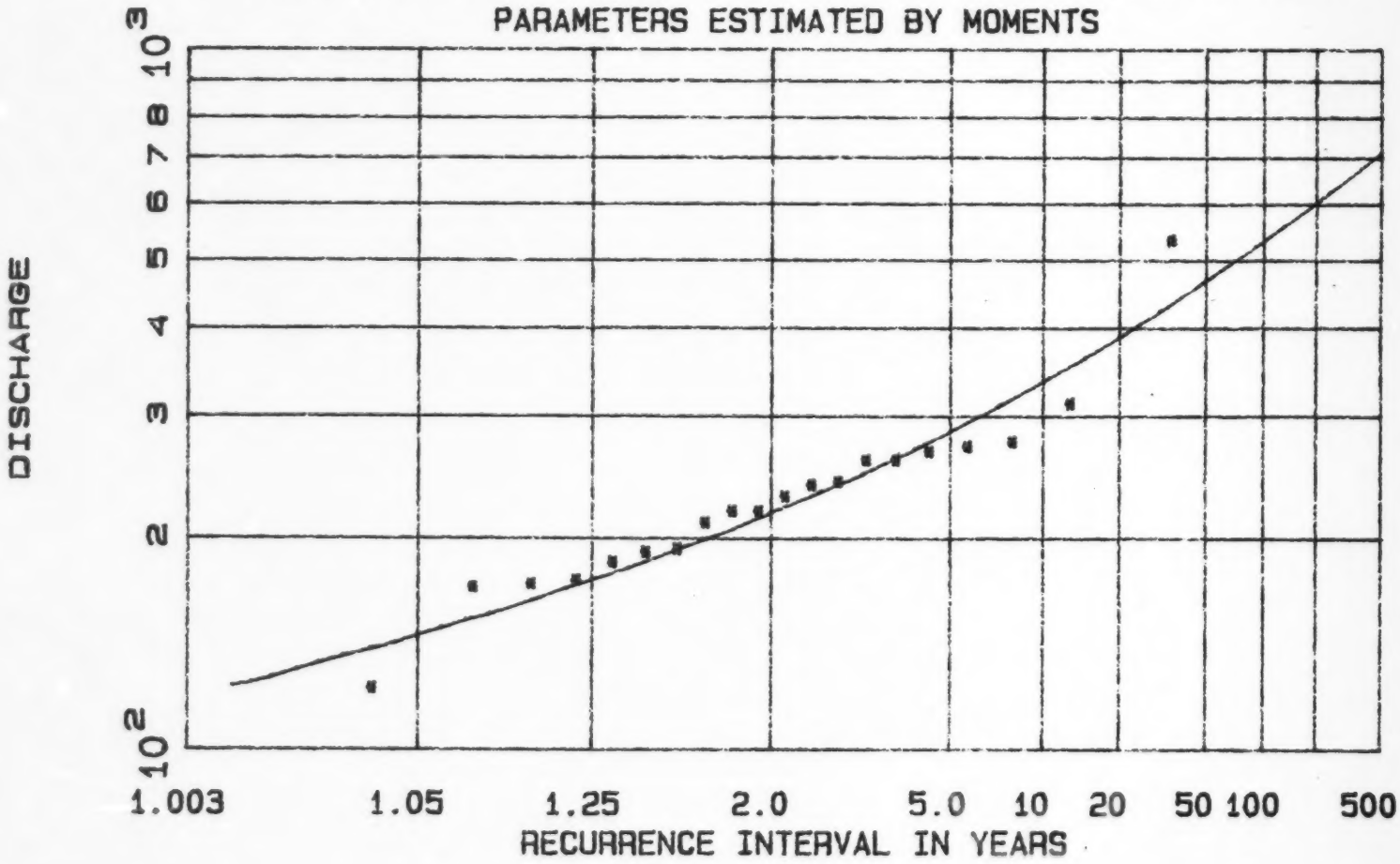
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	118.00
1.050	0.952	146.00
1.250	0.800	175.00
2.000	0.500	218.00
5.000	0.200	285.00
10.000	0.100	335.00
20.000	0.050	389.00
50.000	0.020	468.00
100.000	0.010	534.00
200.000	0.005	606.00
500.000	0.002	714.00

10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE

FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	236.800	83.217	0.351	2.420	12.013
LN X SERIES	5.421	0.298	0.055	0.820	6.613

X(MIN)= 122.000
X(MAX)= 533.000
LOWER OUTLIER LIMIT OF X= 111.235

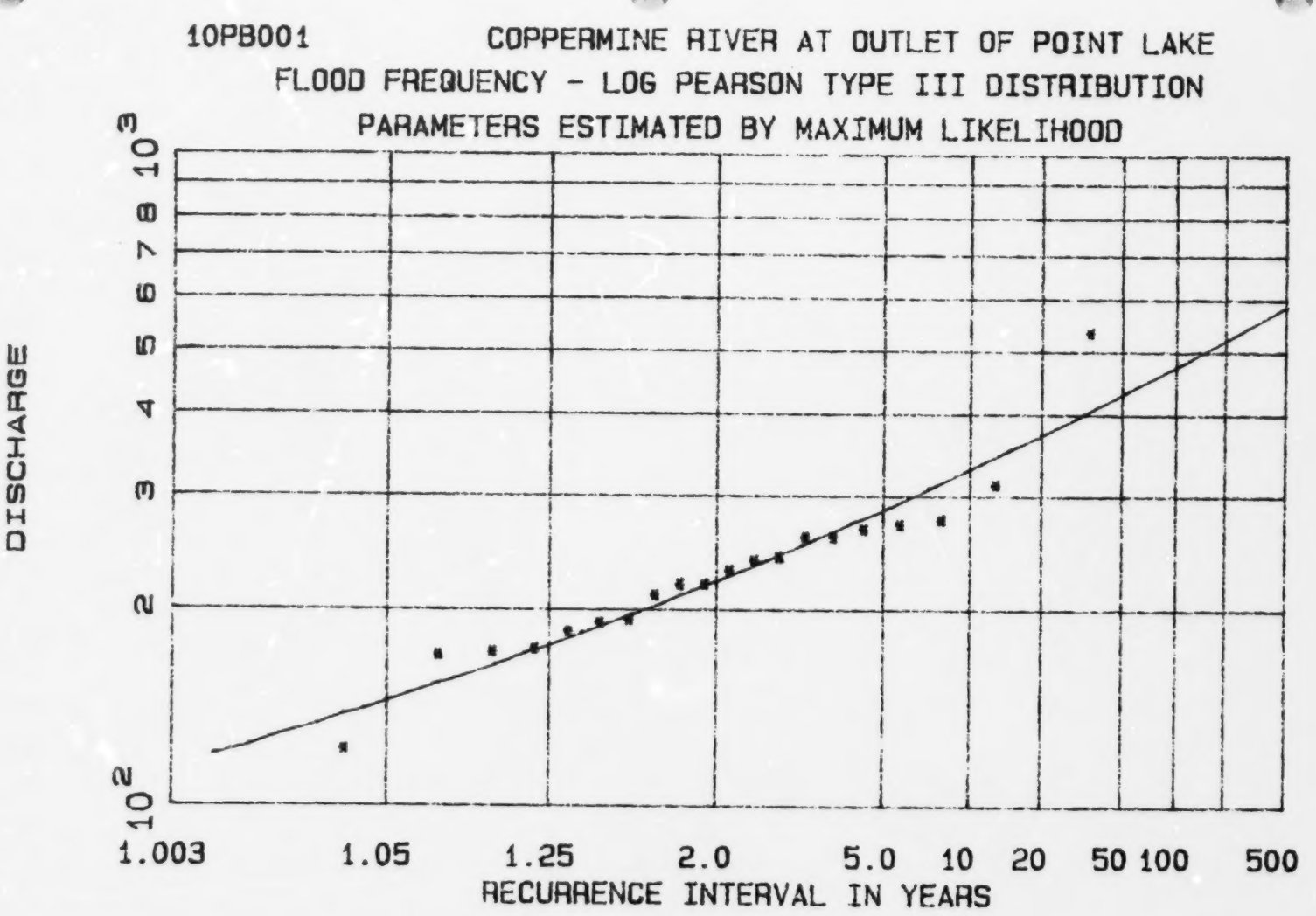
TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

LP3 PARAMETERS: A= 0.5227E-01 B= 30.10 LOG(M)= 3.848
M = 46.90

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	115.00
1.050	0.952	145.00
1.250	0.800	177.00
2.000	0.500	222.00
5.000	0.200	286.00
10.000	0.100	330.00
20.000	0.050	373.00
50.000	0.020	431.00
100.000	0.010	476.00
200.000	0.005	523.00
500.000	0.002	587.00


10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE
FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
8
7
6
5
4
3
2
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10PB001 COPPERMINE RIVER AT OUTLET OF POINT LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	236.800	83.217	0.351	2.420	12.013
LN X SERIES	5.421	0.298	0.055	0.820	6.613

X(MIN)= 122.000
X(MAX)= 533.000
LOWER OUTLIER LIMIT OF X= 111.235

TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED BY ASSUMING M TO BE NON-ZERO. THE ITERATION ALGORITHM WAS NOT REQUIRED.

M= 102.198 A= 100.784 B= 5.93 C= 66.242 D= 0.422

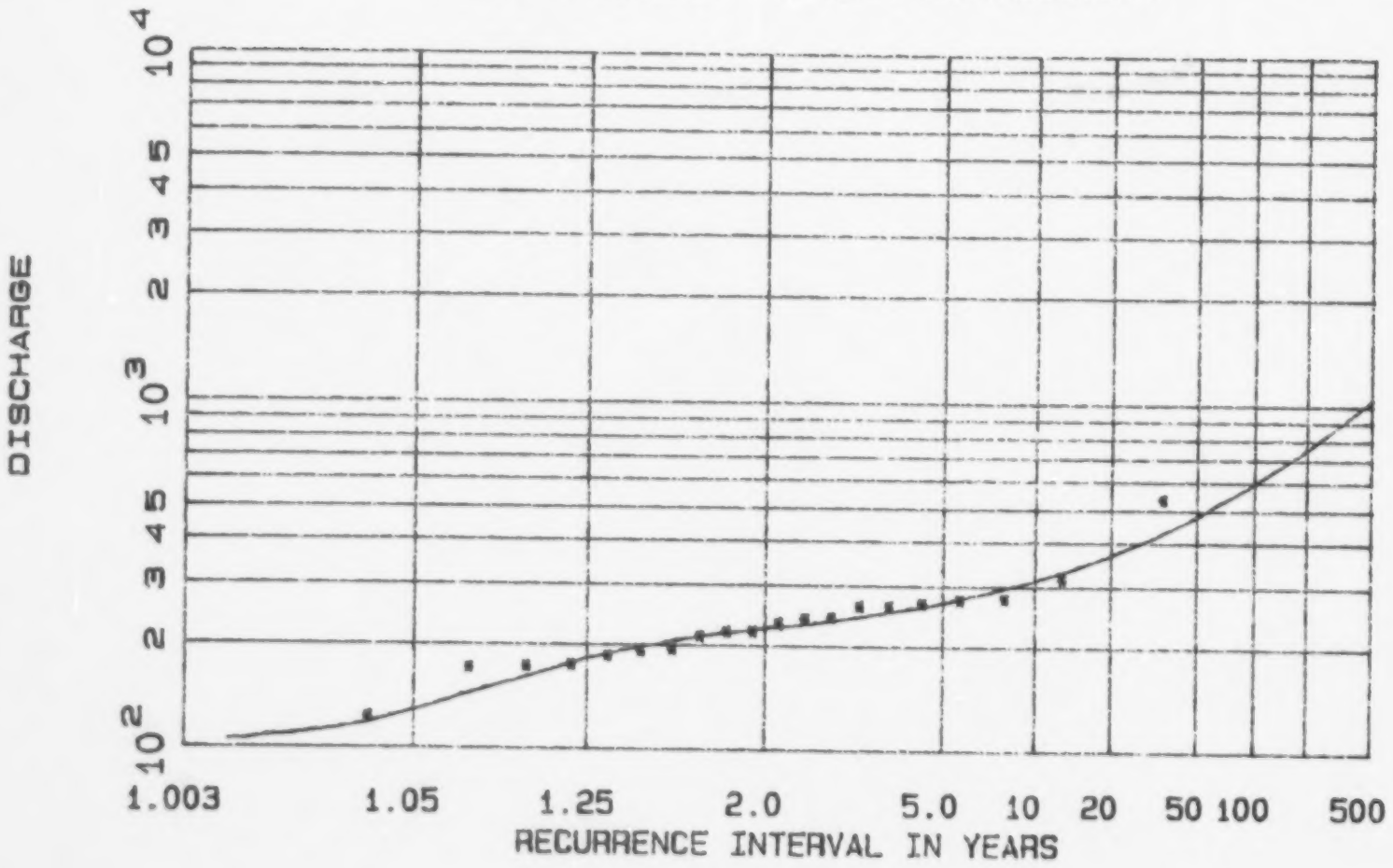
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	104.00
1.050	0.952	129.00
1.250	0.800	183.00
2.000	0.500	224.00
5.000	0.200	267.00
10.000	0.100	312.00
20.000	0.050	371.00
50.000	0.020	482.00
100.000	0.010	599.00
200.000	0.005	756.00
500.000	0.002	1050.00

10PB001

COPPERMINE RIVER AT OUTLET OF POINT LAKE

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=06KC003
WSC STATION NAME=DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1965	442.000	881.000	1	2.83	35.333
6	1966	665.000	835.000	2	7.55	13.250
99	1967	591.000	821.000	3	12.26	8.154
99	1968	881.000	779.000	4	16.98	5.889
7	1969	731.000	731.000	5	21.70	4.609
9	1970	530.000	682.000	6	26.42	3.786
6	1971	527.000	670.000	7	31.13	3.212
6	1972	682.000	665.000	8	35.85	2.789
6	1973	490.000	652.000	9	40.57	2.465
6	1974	518.000	631.000	10	45.28	2.208
6	1975	631.000	603.000	11	50.00	2.000
6	1976	835.000	591.000	12	54.72	1.828
6	1977	580.000	582.000	13	59.43	1.683
7	1978	779.000	580.000	14	64.15	1.559
7	1979	582.000	540.000	15	68.87	1.452
6	1980	652.000	530.000	16	73.58	1.359
7	1981	481.000	527.000	17	78.30	1.277
7	1982	540.000	518.000	18	83.02	1.205
7	1983	603.000	490.000	19	87.74	1.140
6	1984	821.000	481.000	20	92.45	1.082
6	1985	670.000	442.000	21	97.17	1.029

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06KC003 DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	630.048	123.567	0.196	0.548	2.969
LN X SERIES	6.428	0.193	0.030	0.221	2.763
LN(X-A) SERIES	5.777	0.365	0.063	-0.097	2.871

X(MIN)= 442.000
X(MAX)= 881.000
LOWER OUTLIER LIMIT OF X= 389.395

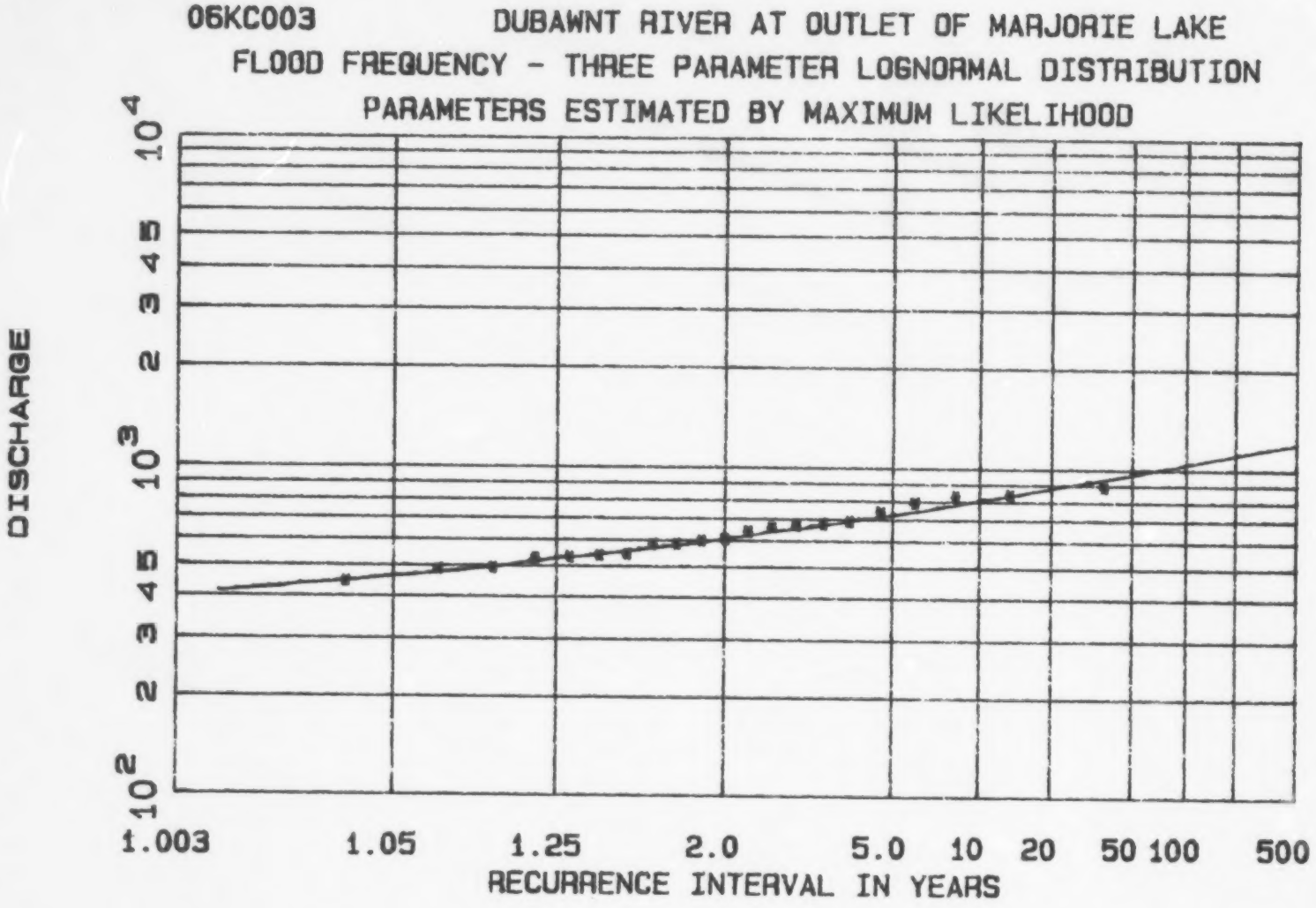
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 286.397 M= 5.777 S= 0.365

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	405.00
1.050	0.952	462.00
1.250	0.800	524.00
2.000	0.500	609.00
5.000	0.200	725.00
10.000	0.100	802.00
20.000	0.050	875.00
50.000	0.020	970.00
100.000	0.010	1040.00
200.000	0.005	1110.00
500.000	0.002	1210.00


06KC003 DUBAWNT RIVER AT OUTLET OF MARJORIE LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10EA002
WSC STATION NAME=FLAT RIVER AT CANTUNG CAMP

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1975	14.900	22.600	1	5.36	18.667
99	1976	16.740	18.700	2	14.29	7.000
6	1977	17.000	17.000	3	23.21	4.308
7	1978	22.600	16.740	4	32.14	3.111
6	1979	15.500	16.300	5	41.07	2.435
6	1980	16.300	15.500	6	50.00	2.000
5	1981	12.400	15.260	7	58.93	1.697
99	1982	15.260	14.900	8	67.86	1.474
6	1983	18.700	12.800	9	76.79	1.302
6	1984	9.700	12.400	10	85.71	1.167
7	1985	12.800	9.700	11	94.64	1.057

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10EA002 FLAT RIVER AT CANTUNG CAMP

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	15.627	3.404	0.218	0.333	5.279
LN X SERIES	2.727	0.224	0.082	-0.421	5.197
LN(X-A) SERIES	3.557	0.096	0.027	0.001	5.079

X(MIN)= 9.700
X(MAX)= 22.600
LOWER OUTLIER LIMIT OF X= 9.582

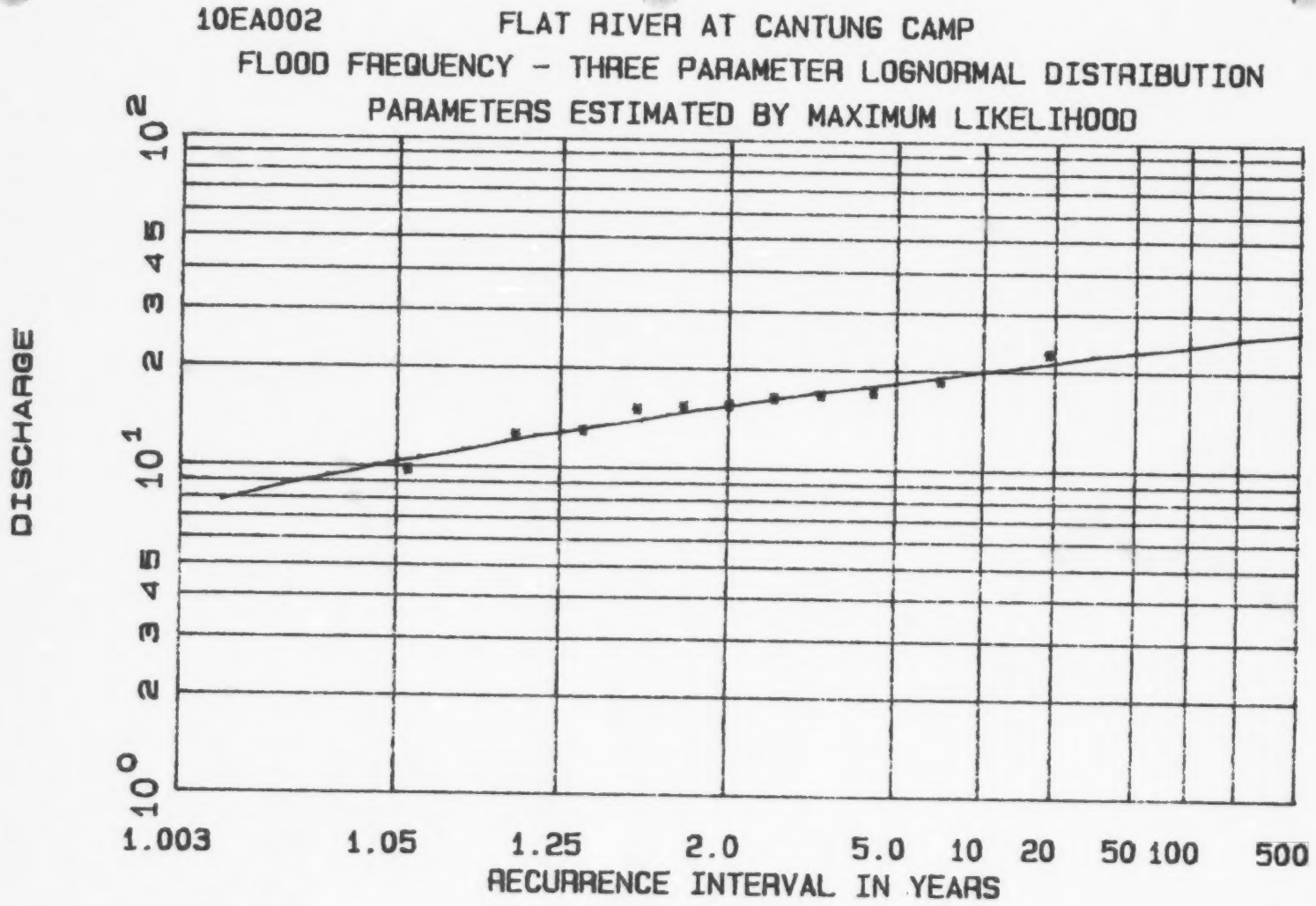
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -19.595 M= 3.557 S= 0.096

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	7.31
1.050	0.952	10.30
1.250	0.800	12.70
2.000	0.500	15.50
5.000	0.200	18.40
10.000	0.100	20.10
20.000	0.050	21.50
50.000	0.020	23.20
100.000	0.010	24.30
200.000	0.005	25.40
500.000	0.002	26.70


10EA002
FLAT RIVER AT CANTUNG CAMP
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^2
2 3 4 5
10^1
2 3 4 5
10^0
2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10EA003
WSC STATION NAME=FLAT RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1961	685.000	1100.000	1	2.38	42.000
6	1962	684.000	949.000	2	6.35	15.750
6	1963	949.000	934.000	3	10.32	9.692
6	1964	702.000	835.000	4	14.29	7.000
7	1965	445.000	829.000	5	18.25	5.478
6	1966	360.000	796.000	6	22.22	4.500
99	1967	829.000	709.000	7	26.19	3.818
7	1968	835.000	702.000	8	30.16	3.316
5	1969	456.000	685.000	9	34.13	2.930
99	1970	433.000	684.000	10	38.10	2.625
6	1971	501.000	665.000	11	42.06	2.377
5	1972	665.000	583.000	12	46.03	2.172
6	1973	934.000	555.000	13	50.00	2.000
6	1974	583.000	527.000	14	53.97	1.853
6	1975	796.000	501.000	15	57.94	1.726
6	1976	453.000	486.000	16	61.90	1.615
6	1977	467.000	467.000	17	65.87	1.518
7	1978	1100.000	456.000	18	69.84	1.432
5	1979	709.000	453.000	19	73.81	1.355
6	1980	527.000	445.000	20	77.78	1.286
6	1981	486.000	433.000	21	81.75	1.223
6	1982	555.000	422.000	22	85.71	1.167
5	1983	300.000	420.000	23	89.68	1.115
6	1984	422.000	360.000	24	93.65	1.068
6	1985	420.000	300.000	25	97.62	1.024

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10EA003 FLAT RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	611.640	206.236	0.337	0.685	3.154
LN X SERIES	6.363	0.332	0.052	0.106	2.699
LN(X-A) SERIES	6.100	0.430	0.070	-0.093	2.876

X(MIN)= 300.000
X(MAX)= 1100.000
LOWER OUTLIER LIMIT OF X= 254.378

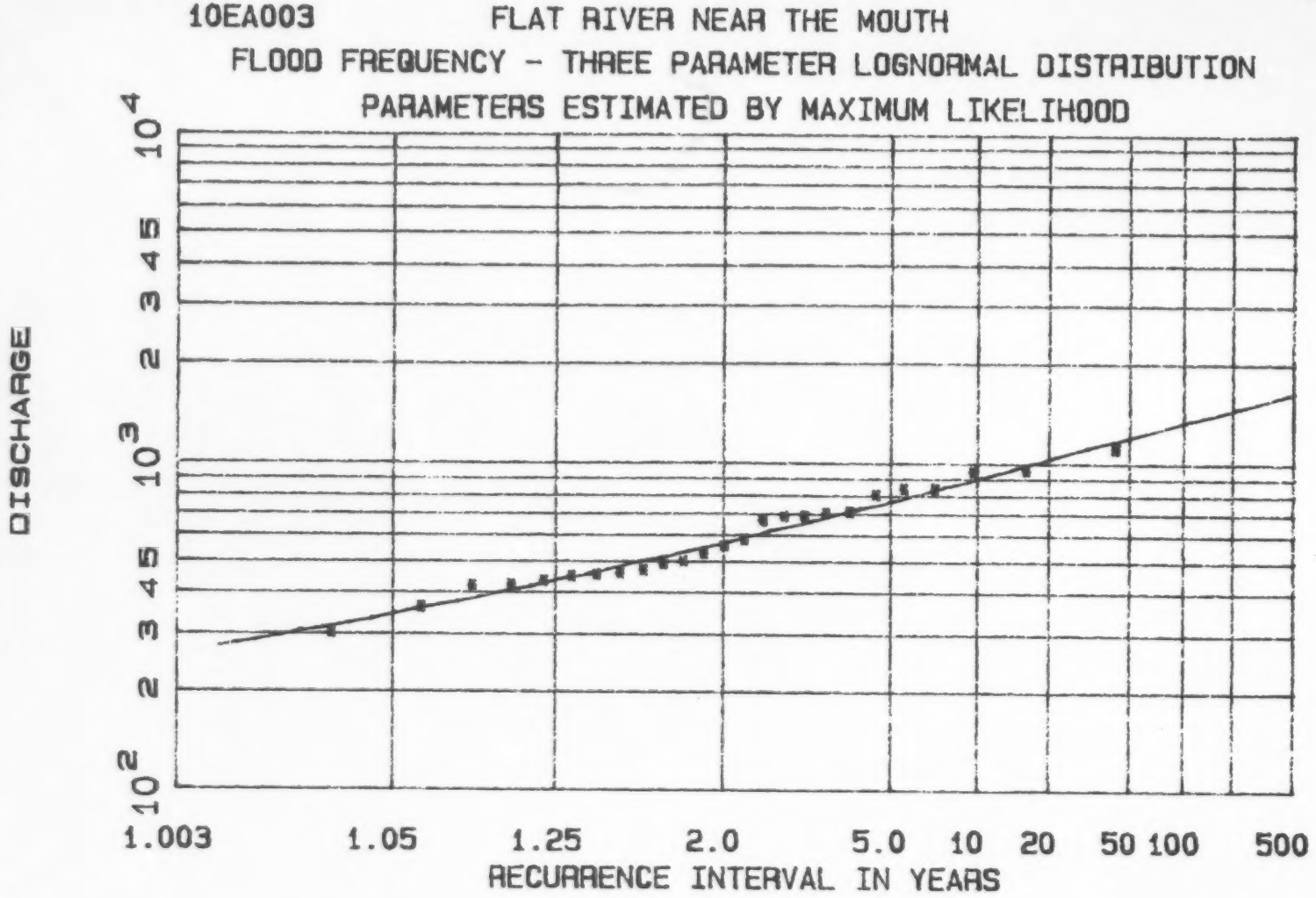
TOTAL SAMPLE SIZE= 25
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 125.478 M= 6.100 S= 0.430

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	262.00
1.050	0.952	343.00
1.250	0.800	436.00
2.000	0.500	571.00
5.000	0.200	766.00
10.000	0.100	899.00
20.000	0.050	1030.00
50.000	0.020	1200.00
100.000	0.010	1340.00
200.000	0.005	1470.00
500.000	0.002	1660.00


10EA003 FLAT RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10JC003
WSC STATION NAME=GREAT BEAR RIVER AT OUTLET OF GREAT BEAR LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1961	779.000	852.000*	1	2.38	42.000
8	1962	852.000	779.000	2	6.35	15.750
8	1963	691.000	725.000	3	10.32	9.692
11	1964	708.000	708.000	4	14.29	7.000
10	1965	725.000	699.000	5	18.25	5.479
9	1966	699.000	691.000	6	22.22	4.500
9	1967	614.000	648.000	7	26.19	3.818
9	1968	555.000	640.000	8	30.16	3.316
9	1969	614.000	623.000	9	34.13	2.930
9	1970	606.000	620.000	10	38.10	2.625
7	1971	648.000	616.000	11	42.06	2.377
7	1972	623.000	614.000	12	46.03	2.172
7	1973	640.000	614.000	13	50.00	2.000
8	1974	578.000	609.000	14	53.97	1.853
6	1975	609.000	606.000	15	57.94	1.726
9	1976	561.000	578.000	16	61.90	1.615
7	1977	555.000	561.000	17	65.87	1.518
8	1978	518.000	555.000	18	69.84	1.432
7	1979	506.000	555.000	19	73.81	1.355
8	1980	544.000	550.000	20	77.78	1.286
10	1981	520.000	544.000	21	81.75	1.223
8	1982	544.000	544.000	22	85.71	1.167
8	1983	550.000	520.000	23	89.68	1.115
9	1984	616.000	518.000	24	93.65	1.068
8	1985	620.000	506.000	25	97.62	1.024

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10JC003 GREAT BEAR RIVER AT OUTLET OF GREAT BEAR LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	619.000	85.214	0.138	1.036	4.433
LN X SERIES	6.420	0.132	0.020	0.718	3.630
LN(X-A) SERIES	4.959	0.530	0.107	-0.123	2.947

X(MIN)= 506.000
X(MAX)= 852.000
LOWER OUTLIER LIMIT OF X= 442.584

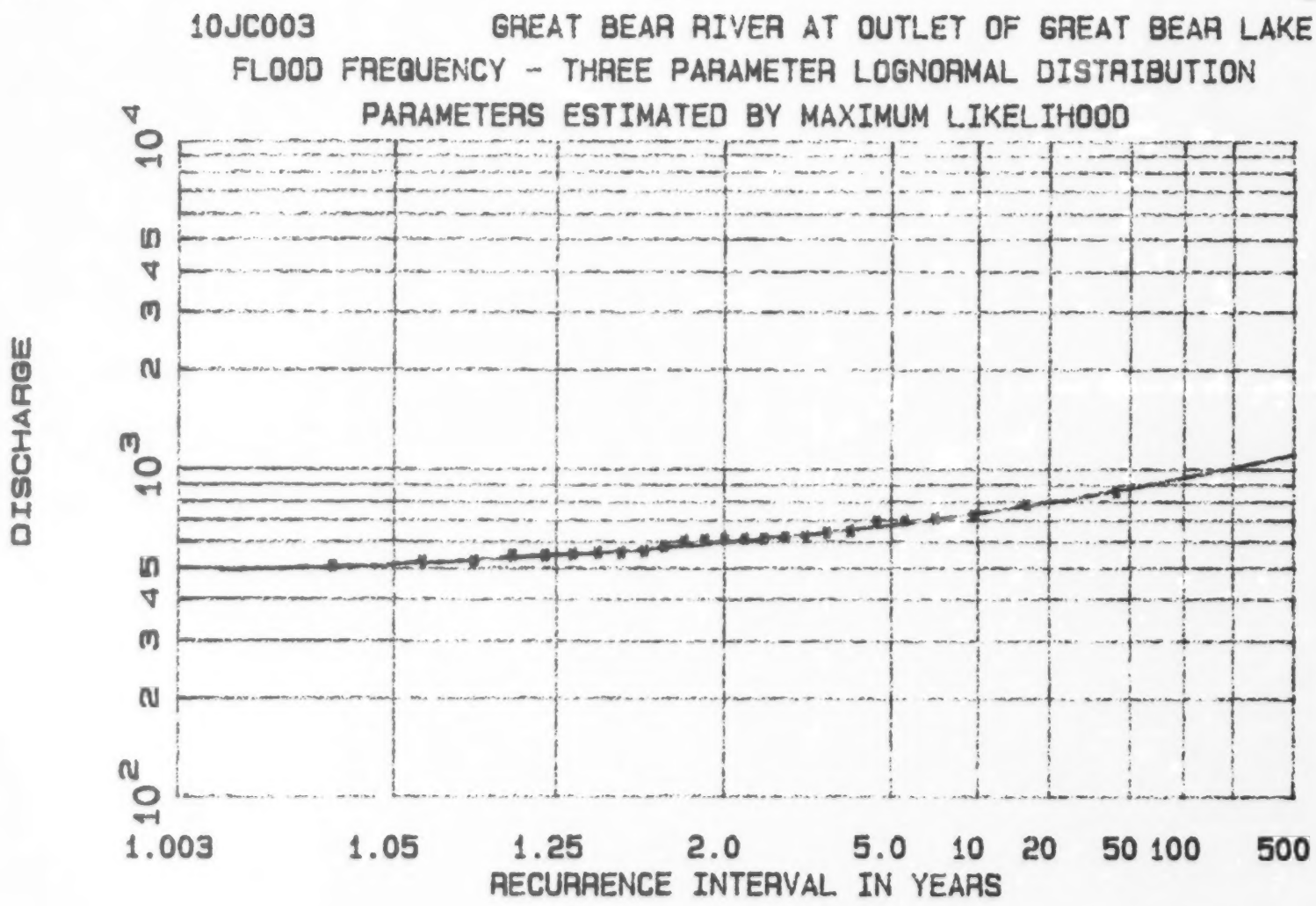
TOTAL SAMPLE SIZE= 25
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 456.703 M= 4.959 S= 0.530

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	490.00
1.050	0.952	516.00
1.250	0.800	548.00
2.000	0.500	599.00
5.000	0.200	679.00
10.000	0.100	738.00
20.000	0.050	797.00
50.000	0.020	880.00
100.000	0.010	946.00
200.000	0.005	1010.00
500.000	0.002	1110.00


10JC003 GREAT BEAR RIVER AT OUTLET OF GREAT BEAR LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10GC002
WSC STATION NAME=HARRIS RIVER NEAR MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1973	8.440	48.300	1	4.55	22.000
5	1974	24.800	43.500	2	12.12	8.250
5	1975	36.200	36.200	3	19.70	5.077
4	1976	28.600	31.300	4	27.27	3.667
99	1977	18.850	28.600	5	34.85	2.870
5	1978	10.500	24.800	6	42.42	2.357
5	1979	14.700	18.850	7	50.00	2.000
5	1980	0.422	15.100	8	57.58	1.737
5	1981	15.100	14.700	9	65.15	1.535
5	1982	43.500	10.500	10	72.73	1.375
8	1983	31.300	8.440	11	80.30	1.245
5	1984	7.490	7.490	12	87.88	1.138
5	1985	48.300	0.422	13	95.45	1.048

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10GC002 HARRIS RIVER NEAR MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	22.169	14.709	0.663	0.400	3.095
LN X SERIES	2.709	1.233	0.455	-2.202	10.002

X(MIN)= 0.422
X(MAX)= 48.300
LOWER OUTLIER LIMIT OF X= 1.030

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

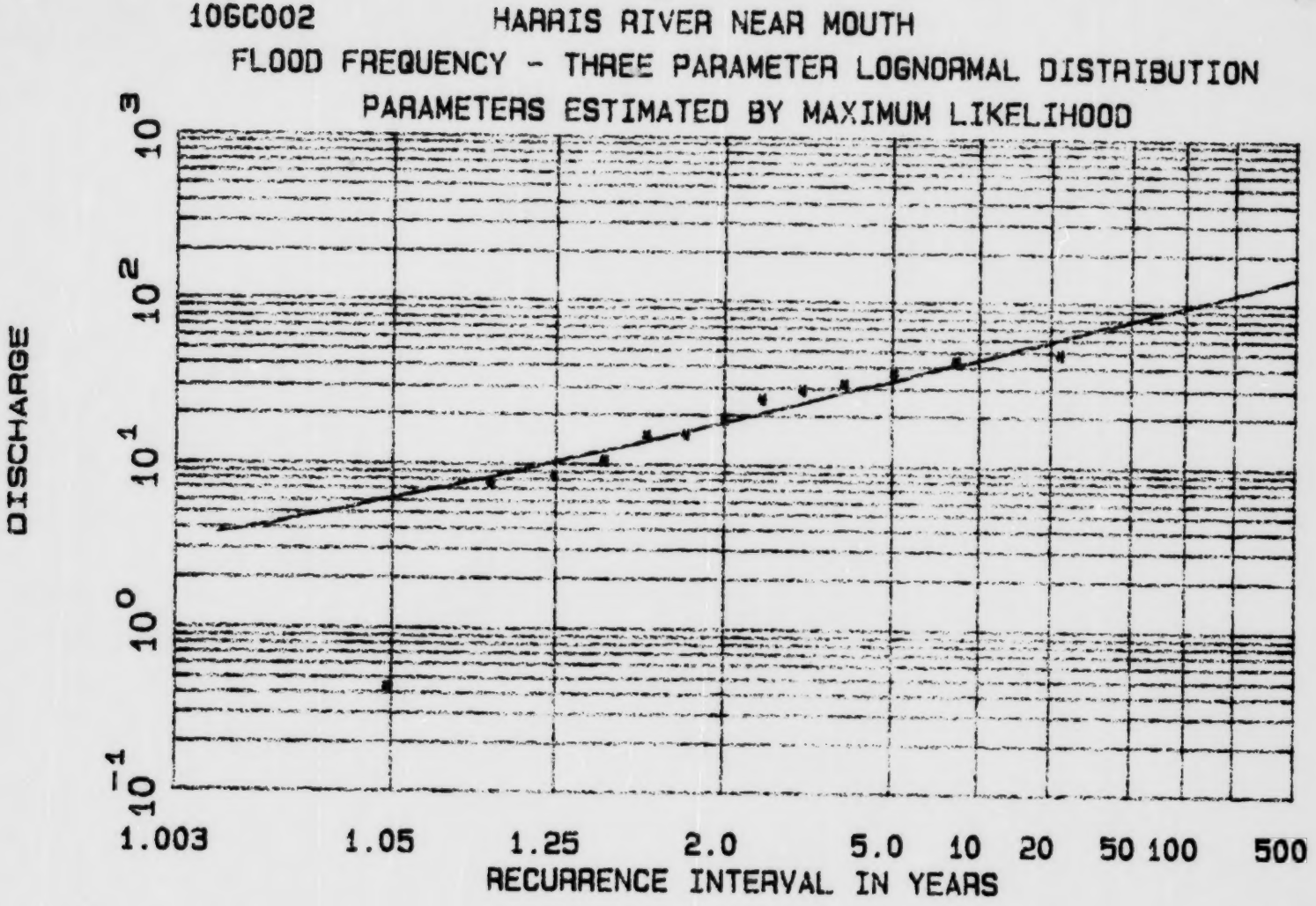
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	23.982	13.764	0.574	0.494	3.074
LN X SERIES	3.007	0.633	0.211	-0.236	2.792
LN(X-A) SERIES	2.940	0.676	0.230	-0.285	2.833

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 1.076 M= 2.850 S= 0.736

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	3.36
1.050	0.952	6.14
1.250	0.800	10.40
2.000	0.500	18.40
5.000	0.200	33.20
10.000	0.100	45.50
20.000	0.050	59.10
50.000	0.020	79.50
100.000	0.010	96.90
200.000	0.005	116.00
500.000	0.002	145.00


10GC002 HARRIS RIVER NEAR MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10GC002 HARRIS RIVER NEAR MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	22.169	14.709	0.663	0.400	3.095
LN X SERIES	2.709	1.233	0.455	-2.202	10.002

X(MIN)= 0.422
X(MAX)= 48.300
LOWER OUTLIER LIMIT OF X= 1.030

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

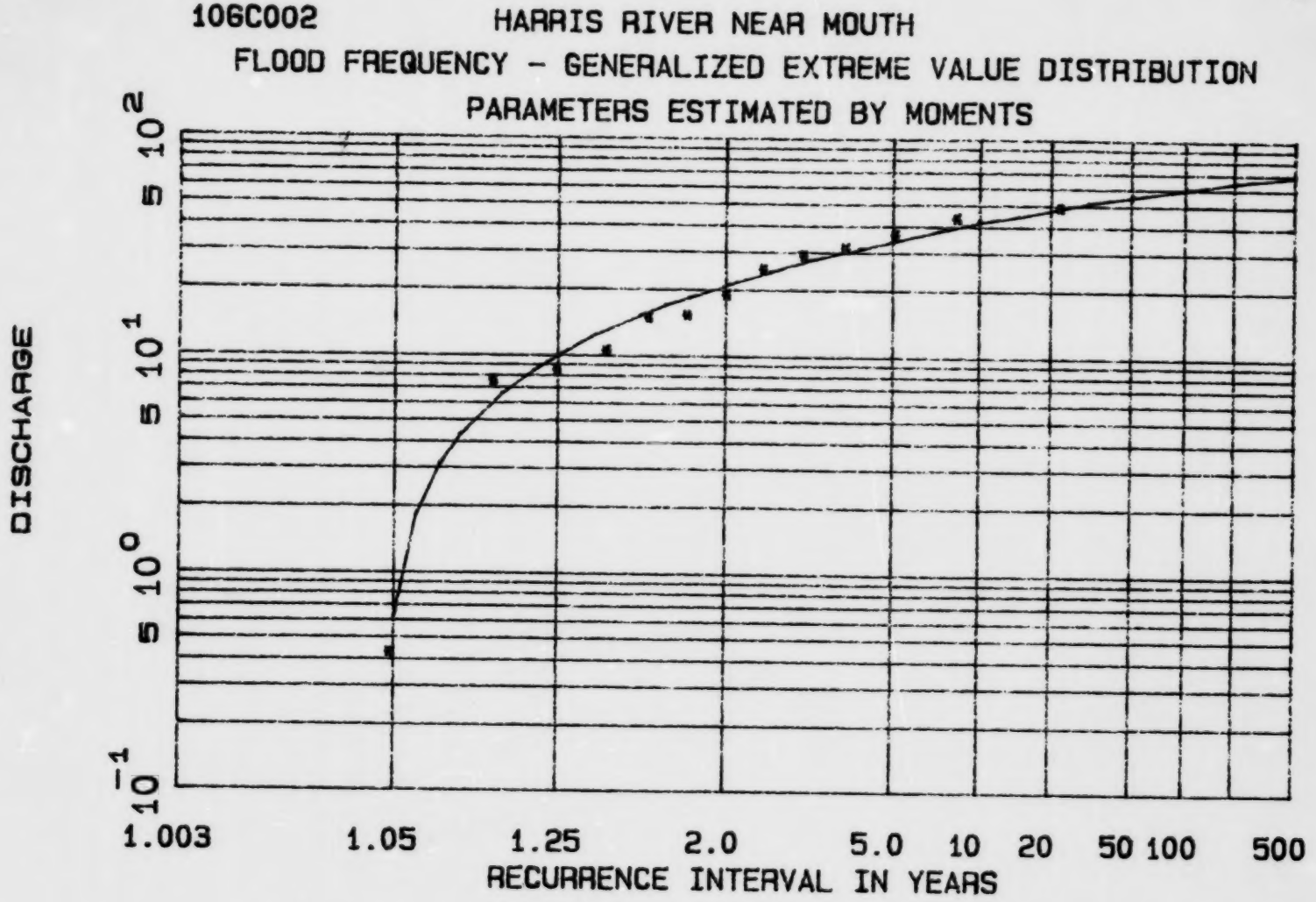
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	23.982	13.764	0.574	0.494	3.074
LN X SERIES	3.007	0.633	0.211	-0.236	2.792

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT (U+A/K)= 0.1056E+03
PARAMETERS OF THE GEV WHICH DUPLICATES THE CONDITIONAL FUNCTION:
U= 16.49 A= 13.117 K= 0.147

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	0.62
1.250	0.800	10.00
2.000	0.500	21.20
5.000	0.200	34.10
10.000	0.100	41.60
20.000	0.050	48.00
50.000	0.020	55.40
100.000	0.010	60.30
200.000	0.005	64.70
500.000	0.002	69.90


106C002 HARRIS RIVER NEAR MOUTH
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
5 10^2
5 10^1
5 10^0
5 10^-1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10GC002 HARRIS RIVER NEAR MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	22.169	14.709	0.663	0.400	3.095
LN X SERIES	2.709	1.233	0.455	-2.202	10.002

X(MIN)= 0.422
X(MAX)= 48.300
LOWER OUTLIER LIMIT OF X= 1.030

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	23.982	13.764	0.574	0.494	3.074
LN X SERIES	3.007	0.633	0.211	-0.236	2.792

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT M= 2958.
PARAMETERS OF THE LP3 WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A=-0.8740E-01 B= 57.84 LOG(M)= 7.992 M = 2958.
SYNTHETIC STATISTICS: MEAN= 2.937 S.D.= 0.665 C.S.=-0.263

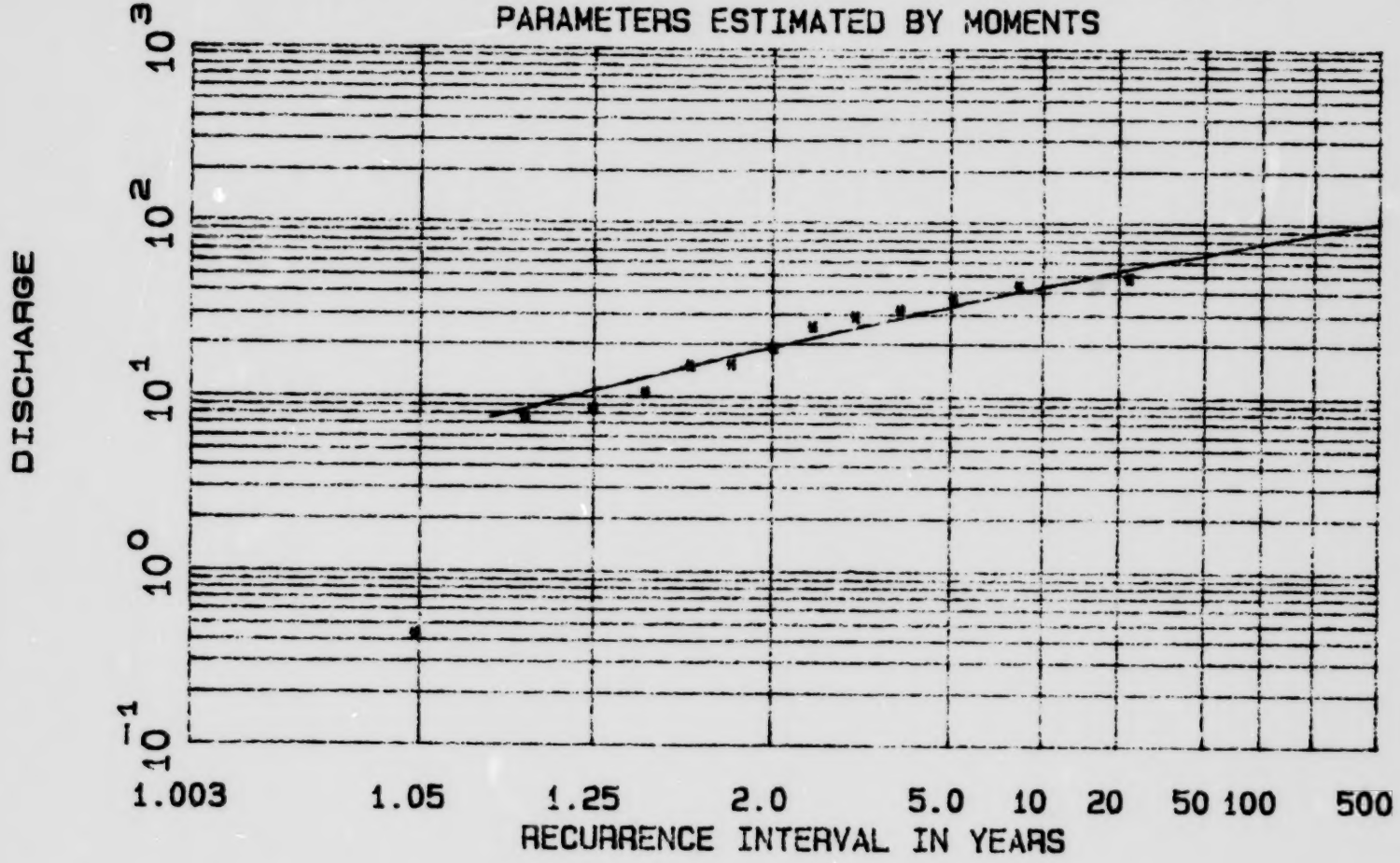
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	10.90
2.000	0.500	19.40
5.000	0.200	33.20
10.000	0.100	43.30
20.000	0.050	53.40
50.000	0.020	67.20
100.000	0.010	77.80
200.000	0.005	88.80
500.000	0.002	104.00

10GC002 HARRIS RIVER NEAR MOUTH

FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10GC002 HARRIS RIVER NEAR MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	22.169	14.709	0.663	0.400	3.095
LN X SERIES	2.709	1.233	0.455	-2.202	10.002

X(MIN)= 0.422
X(MAX)= 48.300
LOWER OUTLIER LIMIT OF X= 1.030

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	23.982	13.764	0.574	0.494	3.074
LN X SERIES	3.007	0.633	0.211	-0.236	2.792

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B. ASSUMING M TO BE NON-ZERO.

M= 4.532 A= 0.282 B= 45.03 C= -69.415 D=-0.382
DISTRIBUTION IS UPPER BOUNDED AT E= 0.7423E+02

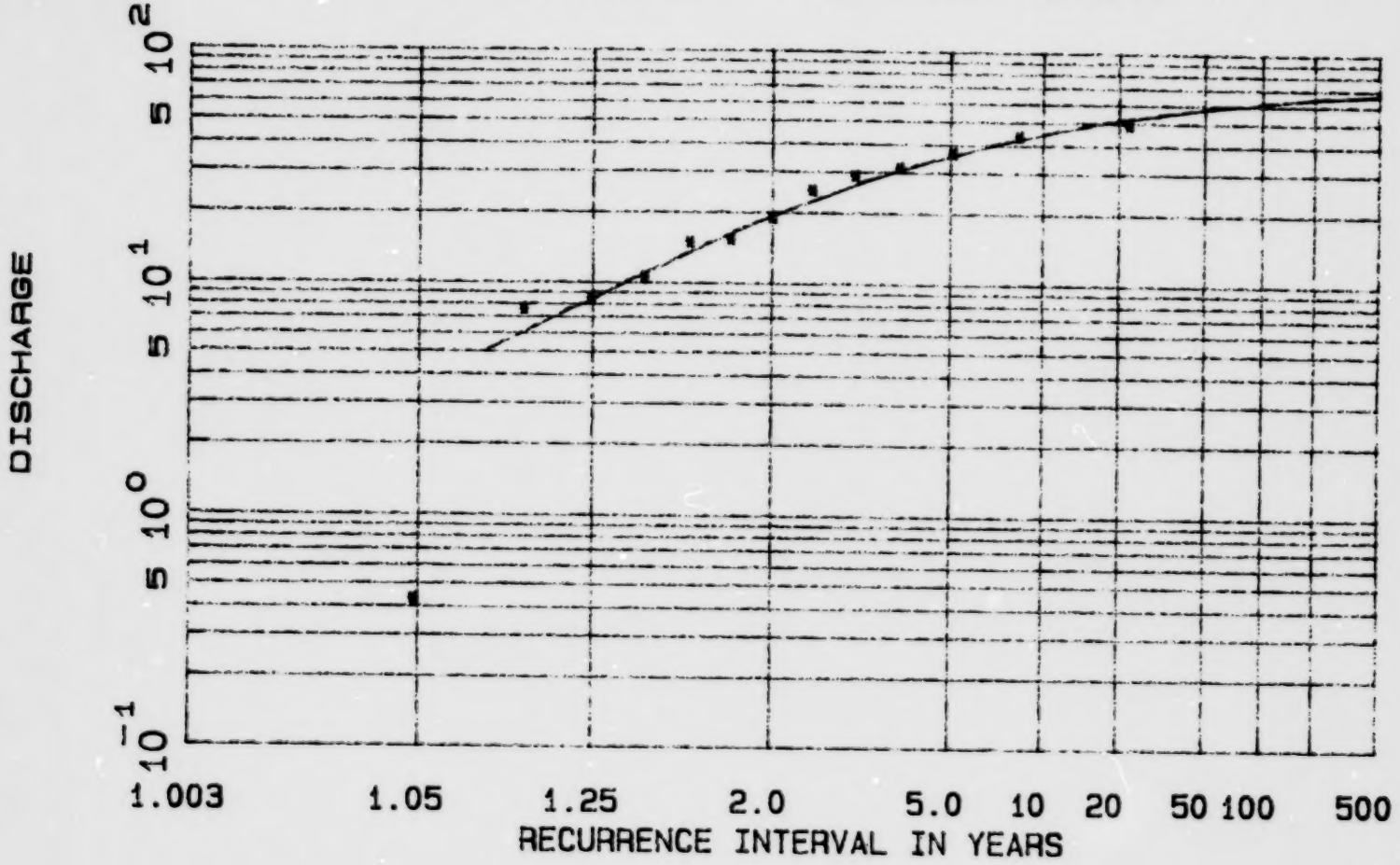
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	8.50
2.000	0.500	19.30
5.000	0.200	35.50
10.000	0.100	44.50
20.000	0.050	51.40
50.000	0.020	58.10
100.000	0.010	61.90
200.000	0.005	64.80
500.000	0.002	67.60

10GC002

HARRIS RIVER NEAR MOUTH

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=07OB001
WSC STATION NAME=HAY RIVER NEAR HAY RIVER

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1964	725.000	1350.000	1	2.70	37.000
5	1965	708.000	1180.000	2	7.21	13.875
5	1966	521.000	1120.000	3	11.71	8.538
5	1967	957.000	1080.000	4	16.22	6.167
5	1968	518.000	1020.000	5	20.72	4.826
5	1969	889.000	957.000	6	25.23	3.964
5	1970	347.000	889.000	7	29.73	3.364
5	1971	600.000	818.000	8	34.23	2.921
5	1972	1020.000	790.000	9	38.74	2.581
4	1973	595.000	725.000	10	43.24	2.313
5	1974	1180.000	708.000	11	47.75	2.094
4	1975	680.000	685.000	12	52.25	1.914
4	1976	685.000	680.000	13	56.76	1.762
6	1977	1080.000	657.000	14	61.26	1.632
5	1978	818.000	617.000	15	65.77	1.521
6	1979	1120.000	600.000	16	70.27	1.423
4	1980	120.000	595.000	17	74.77	1.337
5	1981	790.000	550.000	18	79.28	1.261
5	1982	657.000	521.000	19	83.78	1.194
4	1983	550.000	518.000	20	88.29	1.133
7	1984	617.000	347.000	21	92.79	1.078
5	1985	1350.000	120.000*	22	97.30	1.028

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07OB001 HAY RIVER NEAR HAY RIVER

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	751.227	286.349	0.381	0.108	3.719
LN X SERIES	6.527	0.505	0.077	-1.961	9.619

X(MIN)= 120.000
X(MAX)= 1350.000
LOWER OUTLIER LIMIT OF X= 200.729

TOTAL SAMPLE SIZE= 22
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	781.286	255.391	0.327	0.603	3.281
LN X SERIES	6.610	0.330	0.050	-0.151	3.529
LN(X-A) SERIES	6.818	0.268	0.039	0.019	3.296

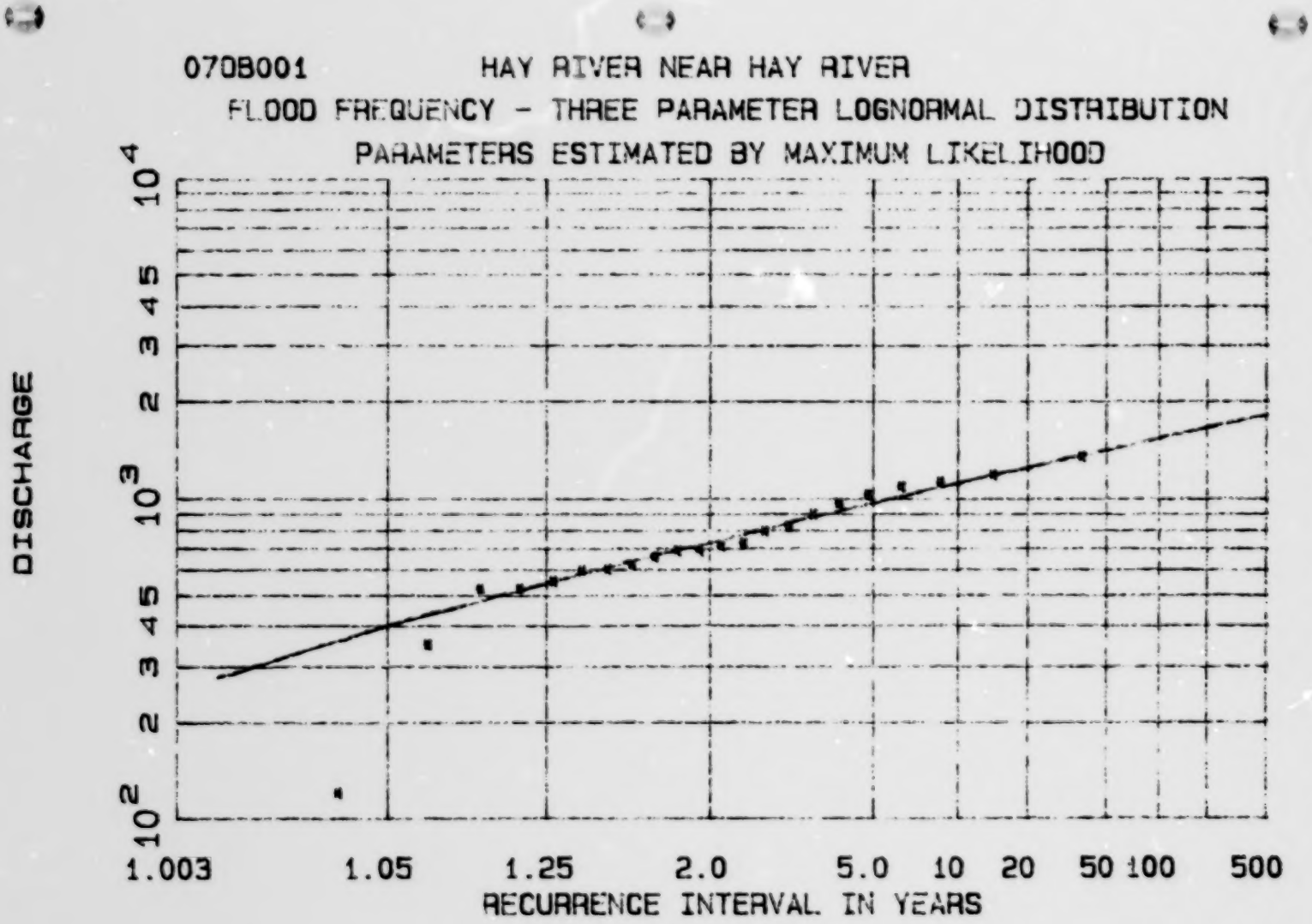
SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= -164.325 M= 6.799 S= 0.278

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	253.00
1.050	0.952	400.00
1.250	0.800	546.00
2.000	0.500	733.00
5.000	0.200	970.00
10.000	0.100	1120.00
20.000	0.050	1250.00
50.000	0.020	1420.00
100.000	0.010	1550.00
200.000	0.005	1670.00
500.000	0.002	1830.00

R???


07OB001 HAY RIVER NEAR HAY RIVER
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10SB001
WSC STATION NAME=HAYES RIVER ABOVE CHANTREY INLET

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1973	954.000	3390.000	1	4.55	22.000
6	1974	609.000	3230.000	2	12.12	8.250
6	1975	934.000	2800.000	3	19.70	5.077
6	1976	3230.000	2310.000	4	27.27	3.667
6	1977	2800.000	2020.000	5	34.85	2.870
7	1978	1380.000	1860.000	6	42.42	2.357
7	1979	1050.000	1620.000	7	50.00	2.000
7	1980	1620.000	1580.000	8	57.58	1.737
99	1981	1860.000	1380.000	9	65.15	1.535
6	1982	3390.000	1050.000	10	72.73	1.375
6	1983	1580.000	954.000	11	80.30	1.245
6	1984	2310.000	934.000	12	87.88	1.138
6	1985	2020.000	609.000	13	95.45	1.048

NOTE A '99' IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10SB001 HAYES RIVER ABOVE CHANTREY INLET

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1825.923	893.505	0.489	0.536	3.167
LN X SERIES	7.391	0.522	0.071	-0.272	3.262
LN(X-A) SERIES	7.520	0.458	0.061	-0.161	3.131

X(MIN)= 609.000
X(MAX)= 3390.000
LOWER OUTLIER LIMIT OF X= 521.270

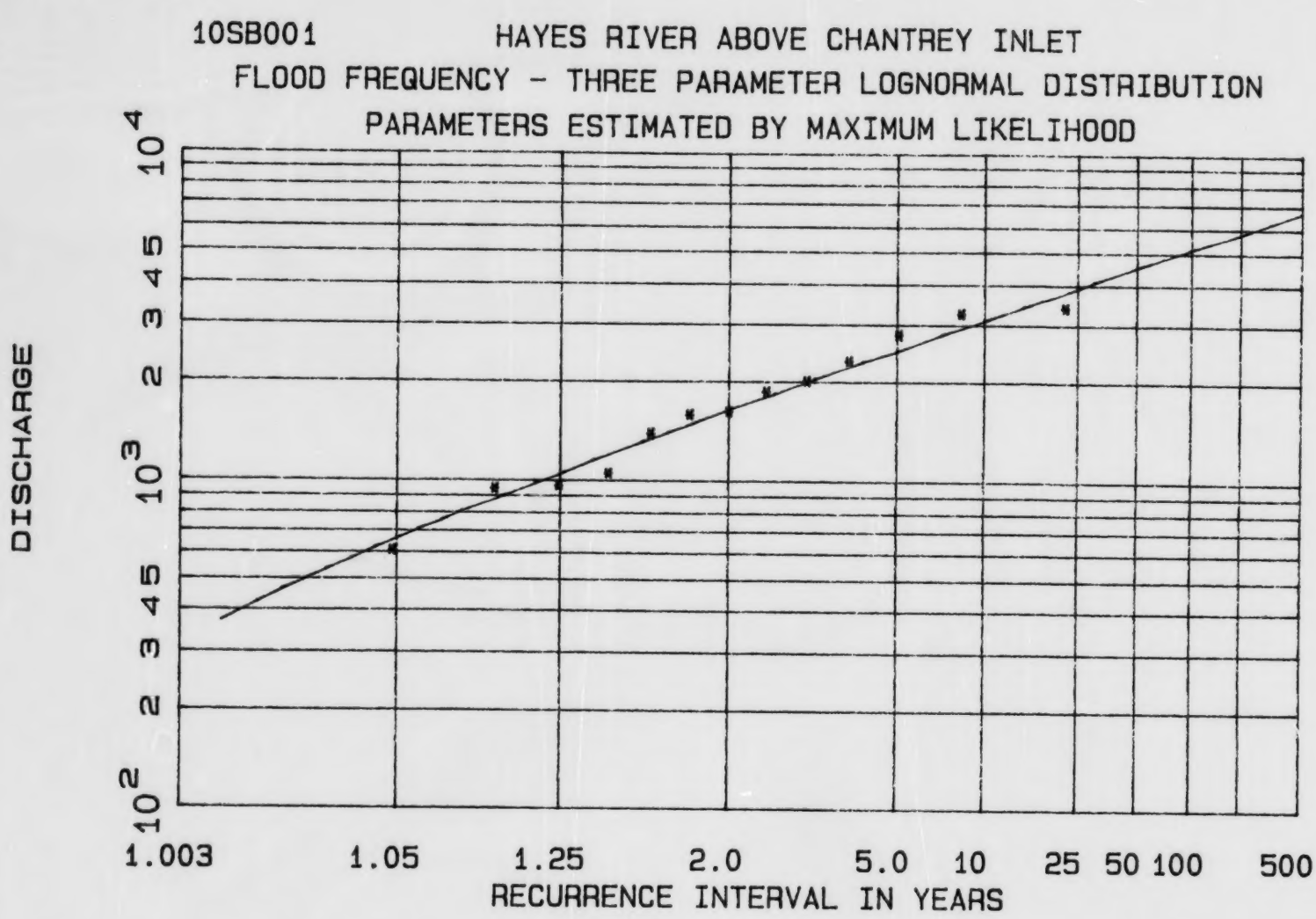
TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -199.599 M= 7.520 S= 0.458

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	324.00
1.050	0.952	659.00
1.250	0.800	1050.00
2.000	0.500	1650.00
5.000	0.200	2510.00
10.000	0.100	3120.00
20.000	0.050	3720.00
50.000	0.020	4530.00
100.000	0.010	5160.00
200.000	0.005	5810.00
500.000	0.002	6700.00


10SB001
HAYES RIVER ABOVE CHANTREY INLET
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10FB005
WSC STATION NAME=JEAN-MARIE RIVER AT FORT SIMPSON HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1973	27.200	90.600	1	4.55	22.000
5	1974	47.300	78.500	2	12.12	8.250
99	1975	58.830	61.200	3	19.70	5.077
5	1976	90.600	58.830	4	27.27	3.667
5	1977	45.000	54.700	5	34.85	2.870
5	1978	26.500	54.600	6	42.42	2.357
5	1979	54.600	47.300	7	50.00	2.000
4	1980	5.550	45.000	8	57.58	1.737
5	1981	54.700	37.900	9	65.15	1.535
5	1982	78.500	27.200	10	72.73	1.375
5	1983	61.200	26.500	11	80.30	1.245
7	1984	15.000	15.000	12	87.88	1.138
5	1985	37.900	5.550*	13	95.45	1.048

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10FB005 JEAN-MARIE RIVER AT FORT SIMPSON HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	46.375	24.132	0.520	0.081	3.665
LN X SERIES	3.643	0.755	0.207	-1.549	6.606

X(MIN)= 5.550
X(MAX)= 90.600
LOWER OUTLIER LIMIT OF X= 7.397

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

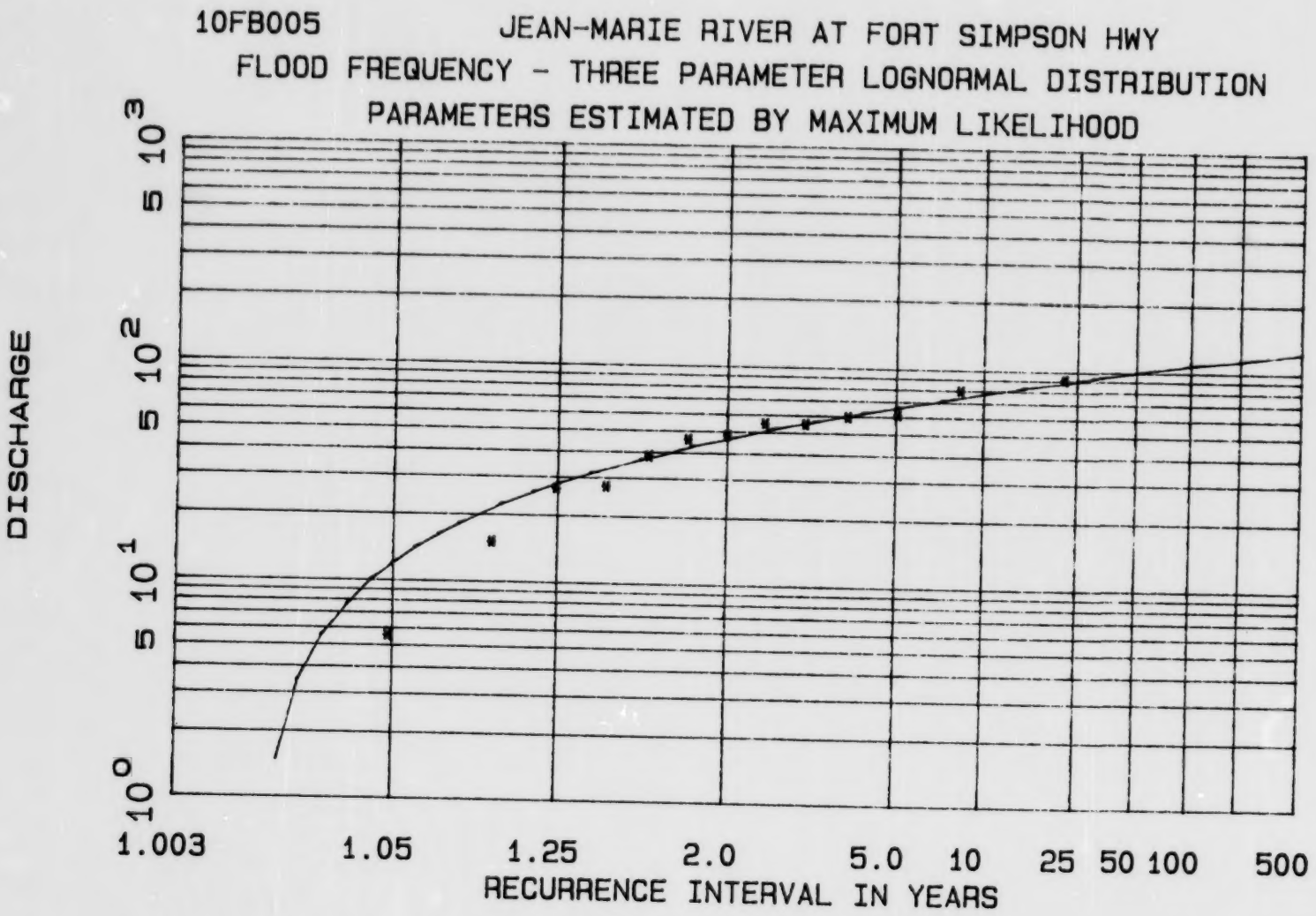
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	49.778	21.706	0.436	0.280	3.918
LN X SERIES	3.804	0.506	0.133	-0.848	4.676
LN(X-A) SERIES	5.297	0.108	0.020	0.032	3.781

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= -151.060 M= 5.285 S= 0.115

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	11.80
1.250	0.800	28.10
2.000	0.500	46.20
5.000	0.200	66.20
10.000	0.100	77.40
20.000	0.050	87.20
50.000	0.020	98.60
100.000	0.010	107.00
200.000	0.005	114.00
500.000	0.002	123.00


10FB005
JEAN-MARIE RIVER AT FORT SIMPSON HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07UC001
WSC STATION NAME=KAKISA RIVER AT OUTLET OF KAKISA LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1964	168.000	196.000	1	2.70	37.000
6	1965	128.000	193.000	2	7.21	13.875
6	1966	161.000	193.000	3	11.71	8.538
6	1967	187.000	187.000	4	16.22	6.167
6	1968	81.800	173.000	5	20.72	4.826
6	1969	117.000	168.000	6	25.23	3.964
6	1970	110.000	161.000	7	29.73	3.364
6	1971	71.900	137.000	8	34.23	2.921
6	1972	121.000	128.000	9	38.74	2.581
9	1973	45.300	126.000	10	43.24	2.313
6	1974	106.000	121.000	11	47.75	2.094
6	1975	126.000	117.000	12	52.25	1.914
6	1976	193.000	110.000	13	56.76	1.762
6	1977	94.600	106.000	14	61.26	1.632
6	1978	47.900	94.600	15	65.77	1.521
6	1979	196.000	81.800	16	70.27	1.423
5	1980	8.160	79.800	17	74.77	1.337
6	1981	57.700	71.900	18	79.28	1.261
6	1982	193.000	57.700	19	83.78	1.194
6	1983	137.000	47.900	20	88.29	1.133
10	1984	79.800	45.300	21	92.79	1.078
6	1985	173.000	8.160*	22	97.30	1.028

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07UC001 KAKISA RIVER AT OUTLET OF KAKISA LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	118.325	54.139	0.458	-0.173	2.673
LN X SERIES	4.608	0.715	0.155	-2.194	10.011

X(MIN)= 8.160
X(MAX)= 196.000
LOWER OUTLIER LIMIT OF X= 17.651

TOTAL SAMPLE SIZE= 22
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	123.571	49.416	0.400	0.019	2.332
LN X SERIES	4.727	0.456	0.096	-0.627	2.986
LN(X-A) SERIES	8.782	0.008	0.001	0.009	2.335

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= -6392.127 M= 8.781 S= 0.008

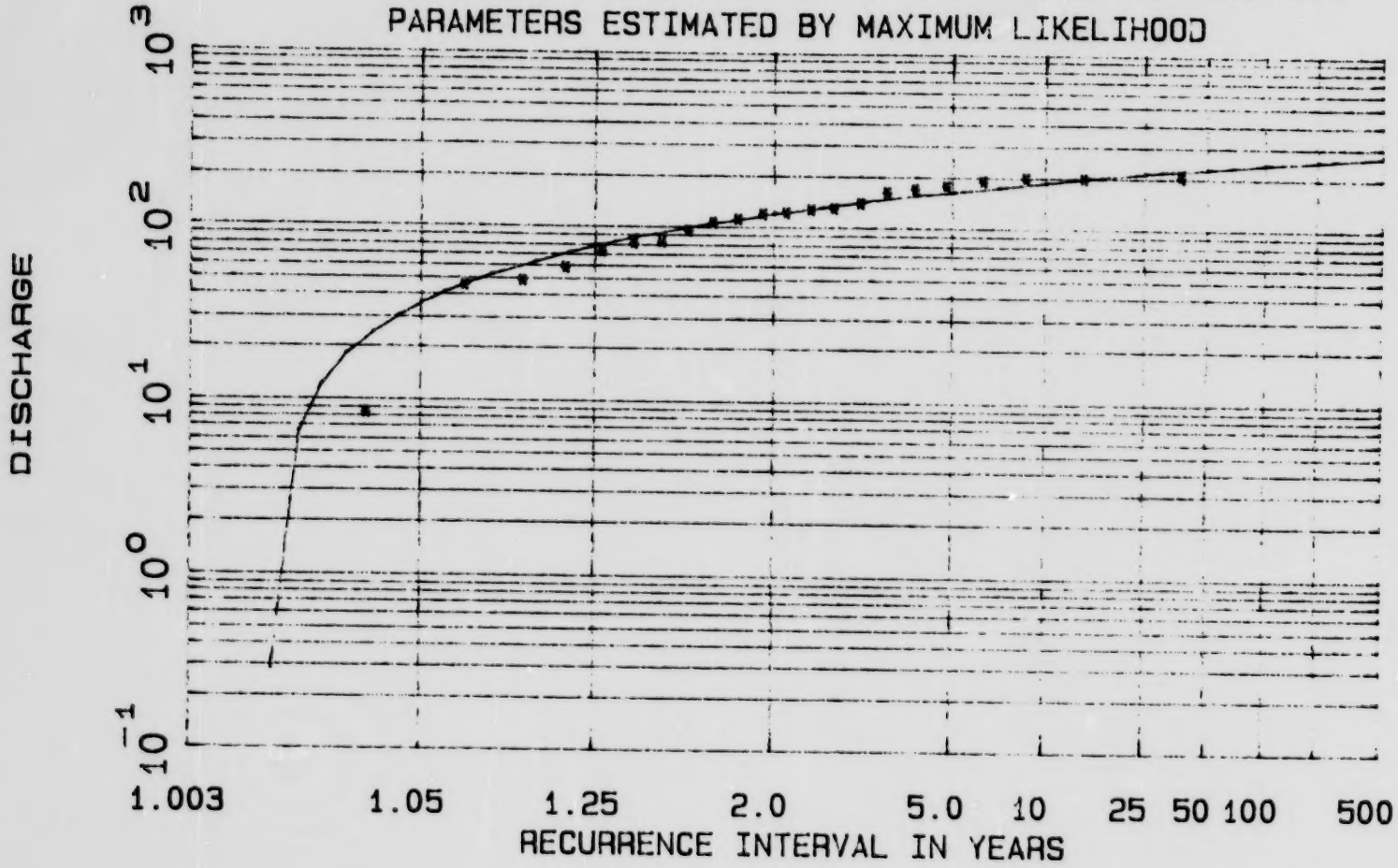
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	35.40
1.250	0.800	77.20
2.000	0.500	120.00
5.000	0.200	163.00
10.000	0.100	186.00
20.000	0.050	205.00
50.000	0.020	226.00
100.000	0.010	240.00
200.000	0.005	253.00
500.000	0.002	269.00

07UC001 KAKISA RIVER AT OUTLET OF KAKISA LAKE

FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



WSC STATION NO=06LC001
WSC STATION NAME=KAZAN RIVER ABOVE KAZAN FALLS

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1966	1810.000	2090.000	1	2.97	33.667
6	1967	1470.000	1930.000	2	7.92	12.625
7	1968	2090.000	1890.000	3	12.87	7.769
99	1969	1485.000	1840.000	4	17.82	5.611
6	1970	1290.000	1810.000	5	22.77	4.391
99	1971	1036.000	1720.000	6	27.72	3.607
7	1972	1390.000	1600.000	7	32.67	3.061
6	1973	1890.000	1530.000	8	37.62	2.658
6	1974	1090.000	1490.000	9	42.57	2.349
6	1975	1930.000	1485.000	10	47.52	2.104
6	1976	1490.000	1470.000	11	52.48	1.906
6	1977	1260.000	1390.000	12	57.43	1.741
6	1978	1840.000	1350.000	13	62.38	1.603
7	1979	1530.000	1320.000	14	67.33	1.485
6	1980	1600.000	1290.000	15	72.28	1.384
7	1981	1350.000	1260.000	16	77.23	1.295
6	1982	1170.000	1260.000	17	82.18	1.217
7	1983	1260.000	1170.000	18	87.13	1.148
6	1984	1720.000	1090.000	19	92.08	1.086
7	1985	1320.000	1036.000	20	97.03	1.031

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06LC001 KAZAN RIVER ABOVE KAZAN FALLS

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1501.050	296.994	0.198	0.374	2.782
LN X SERIES	7.295	0.197	0.027	0.046	2.728
LN(X-A) SERIES	6.988	0.268	0.038	-0.080	2.796

X(MIN)= 1036.000
X(MAX)= 2090.000
LOWER OUTLIER LIMIT OF X= 920.847

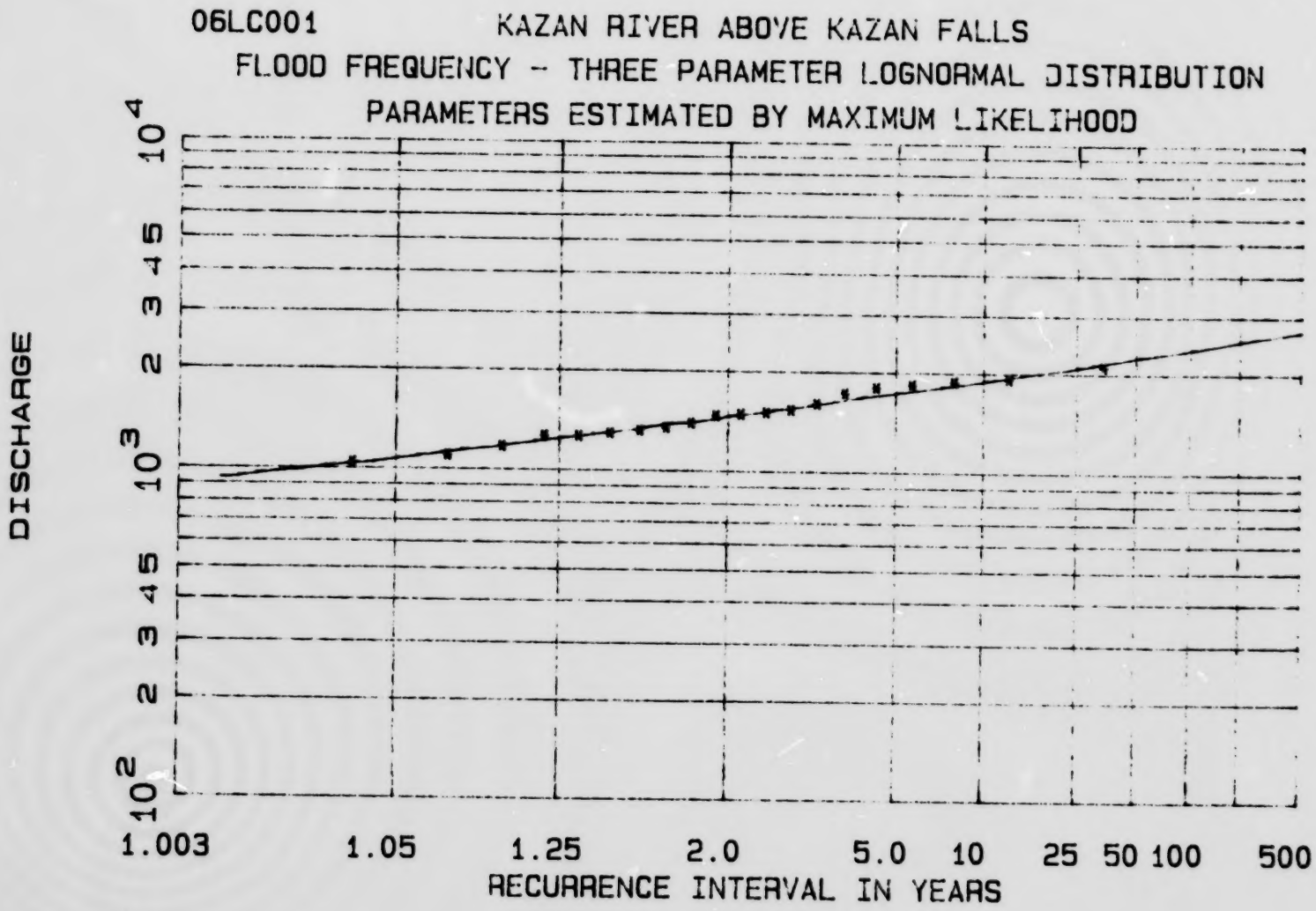
TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 380.346 M= 6.988 S= 0.268

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	899.00
1.050	0.952	1070.00
1.250	0.800	1250.00
2.000	0.500	1460.00
5.000	0.200	1740.00
10.000	0.100	1910.00
20.000	0.050	2060.00
50.000	0.020	2260.00
100.000	0.010	2400.00
200.000	0.005	2540.00
500.000	0.002	2720.00


06LC001
KAZAN RIVER ABOVE KAZAN FALLS
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=06LA001
WSC STATION NAME=KAZAN RIVER AT OUTLET OF ENNADAI LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1966	261.000	399.000	1	2.97	33.667
7	1967	207.000	365.000	2	7.92	12.625
10	1968	399.000	298.000	3	12.87	7.769
6	1969	212.000	279.000	4	17.82	5.611
8	1970	140.000	275.000	5	22.77	4.391
6	1971	127.000	270.000	6	27.72	3.607
10	1972	225.000	261.000	7	32.67	3.061
6	1973	219.000	252.000	8	37.62	2.658
8	1974	108.000	236.000	9	42.57	2.349
7	1975	169.000	235.000	10	47.52	2.104
6	1976	365.000	225.000	11	52.48	1.906
6	1977	270.000	223.000	12	57.43	1.741
7	1978	252.000	219.000	13	62.38	1.603
6	1979	223.000	212.000	14	67.33	1.485
9	1980	156.000	207.000	15	72.28	1.384
7	1981	236.000	169.000	16	77.23	1.295
6	1982	279.000	156.000	17	82.18	1.217
7	1983	275.000	140.000	18	87.13	1.148
7	1984	298.000	127.000	19	92.08	1.086
6	1985	235.000	108.000	20	97.03	1.031

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06LA001 KAZAN RIVER AT OUTLET OF ENNADAI LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	232.800	73.493	0.316	0.407	3.940
LN X SERIES	5.400	0.333	0.062	-0.485	3.643
LN(X-A) SERIES	6.191	0.148	0.024	-0.015	3.571

X(MIN)= 108.000
X(MAX)= 399.000
LOWER OUTLIER LIMIT OF X= 99.975

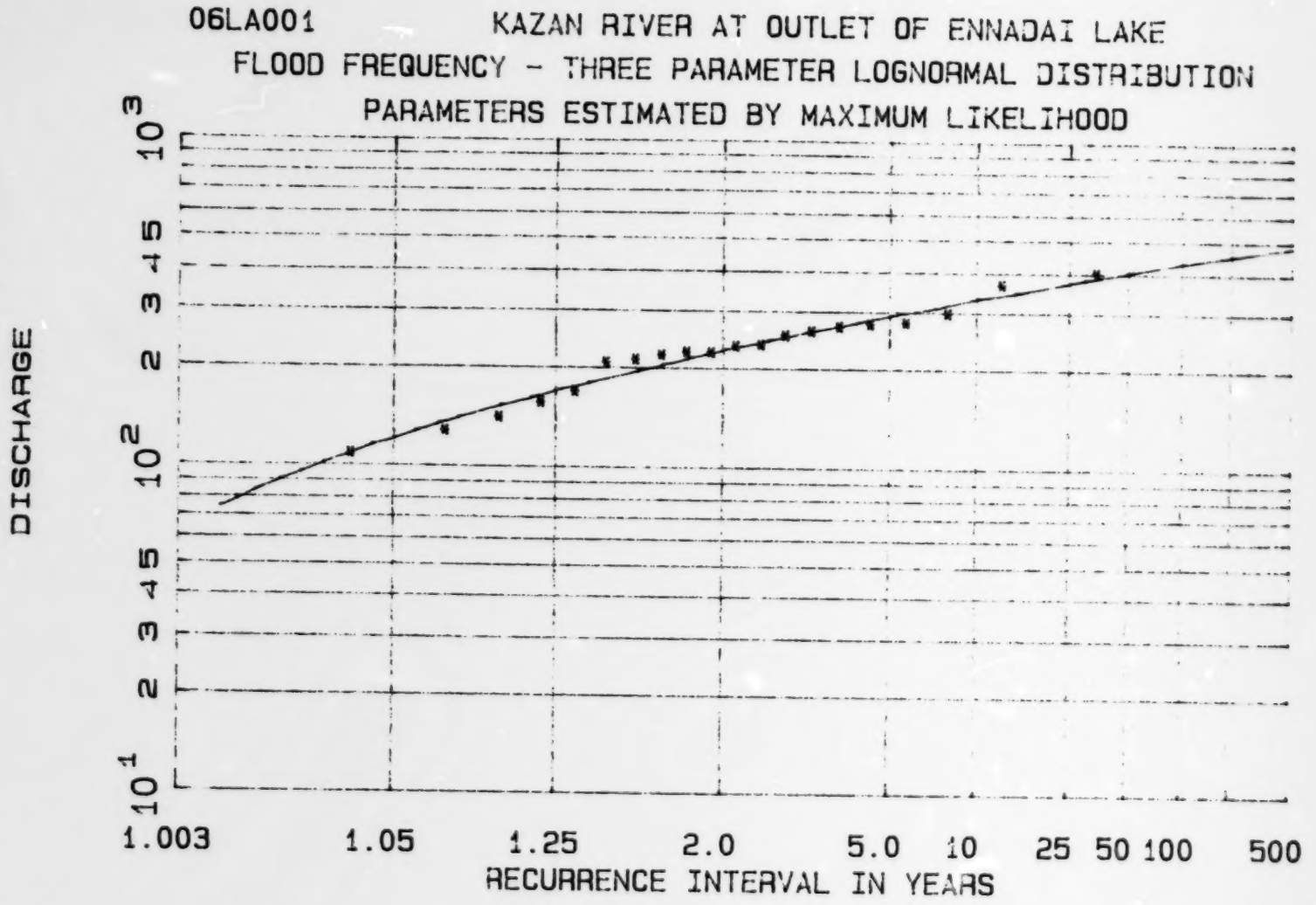
TOTAL SAMPLE SIZE= 20
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -260.737 M= 6.191 S= 0.148

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	64.00
1.050	0.952	120.00
1.250	0.800	170.00
2.000	0.500	228.00
5.000	0.200	293.00
10.000	0.100	330.00
20.000	0.050	363.00
50.000	0.020	402.00
100.000	0.010	429.00
200.000	0.005	455.00
500.000	0.002	488.00


06LA001
KAZAN RIVER AT OUTLET OF ENNADAI LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10ED001H
WSC STATION NAME=LIARD RIVER AT FORT LIARD

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1944	6230.000	16454.000	1	1.42	70.333
6	1945	6770.000	14200.000	2	3.79	26.375
5	1946	5570.000	12600.000	3	6.16	16.231
6	1947	7920.000	12500.000	4	8.53	11.722
5	1948	9710.000	12000.000	5	10.90	9.174
7	1949	8610.000	11800.000	6	13.27	7.536
5	1950	5610.000	11500.000	7	15.64	6.394
5	1951	8230.000	11413.000	8	18.01	5.553
7	1952	7230.000	11300.000	9	20.38	4.907
7	1953	6050.000	11000.000	10	22.75	4.396
5	1954	7370.000	10450.000	11	25.12	3.981
7	1955	9310.000	10400.000	12	27.49	3.638
7	1956	9487.000	10000.000	13	29.86	3.349
5	1957	9120.000	9912.000	14	32.23	3.103
6	1958	4310.000	9710.000	15	34.60	2.890
6	1959	6800.000	9487.000	16	36.97	2.705
6	1960	8670.000	9460.000	17	39.34	2.542
5	1961	12000.000	9310.000	18	41.71	2.398
6	1962	10450.000	9120.000	19	44.08	2.269
7	1963	16454.000	9090.000	20	46.45	2.153
6	1964	11413.000	8890.000	21	48.82	2.049
4	1965	9912.000	8670.000	22	51.18	1.954
7	1966	6400.000	8610.000	23	53.55	1.867
6	1967	7330.000	8230.000	24	55.92	1.788
7	1968	9090.000	7920.000	25	58.29	1.715
5	1969	6230.000	7840.000	26	60.66	1.648
6	1970	7840.000	7610.000	27	63.03	1.586
6	1971	10400.000	7370.000	28	65.40	1.529
6	1972	10000.000	7330.000	29	67.77	1.476
6	1973	11300.000	7230.000	30	70.14	1.426
7	1974	12500.000	6870.000	31	72.51	1.379
7	1975	12600.000	6800.000	32	74.88	1.335
6	1976	11800.000	6770.000	33	77.25	1.294
6	1977	14200.000	6510.000	34	79.62	1.256
6	1978	4960.000	6400.000	35	81.99	1.220
7	1979	11500.000	6230.000	36	84.36	1.185
7	1980	6510.000	6230.000	37	86.73	1.153
5	1981	9460.000	6050.000	38	89.10	1.122
5	1982	11000.000	5610.000	39	91.47	1.093
6	1983	6870.000	5570.000	40	93.84	1.066
6	1984	8890.000	4960.000	41	96.21	1.039
6	1985	7610.000	4310.000	42	98.58	1.014

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10ED001H LIARD RIVER AT FORT LIARD

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	8898.000	2610.323	0.293	0.627	3.628
LN X SERIES	9.052	0.294	0.033	-0.103	2.919
LN(X-A) SERIES	9.143	0.269	0.029	-0.041	2.897

X(MIN)= 4310.000
X(MAX)= 16454.000
LOWER OUTLIER LIMIT OF X= 3854.454

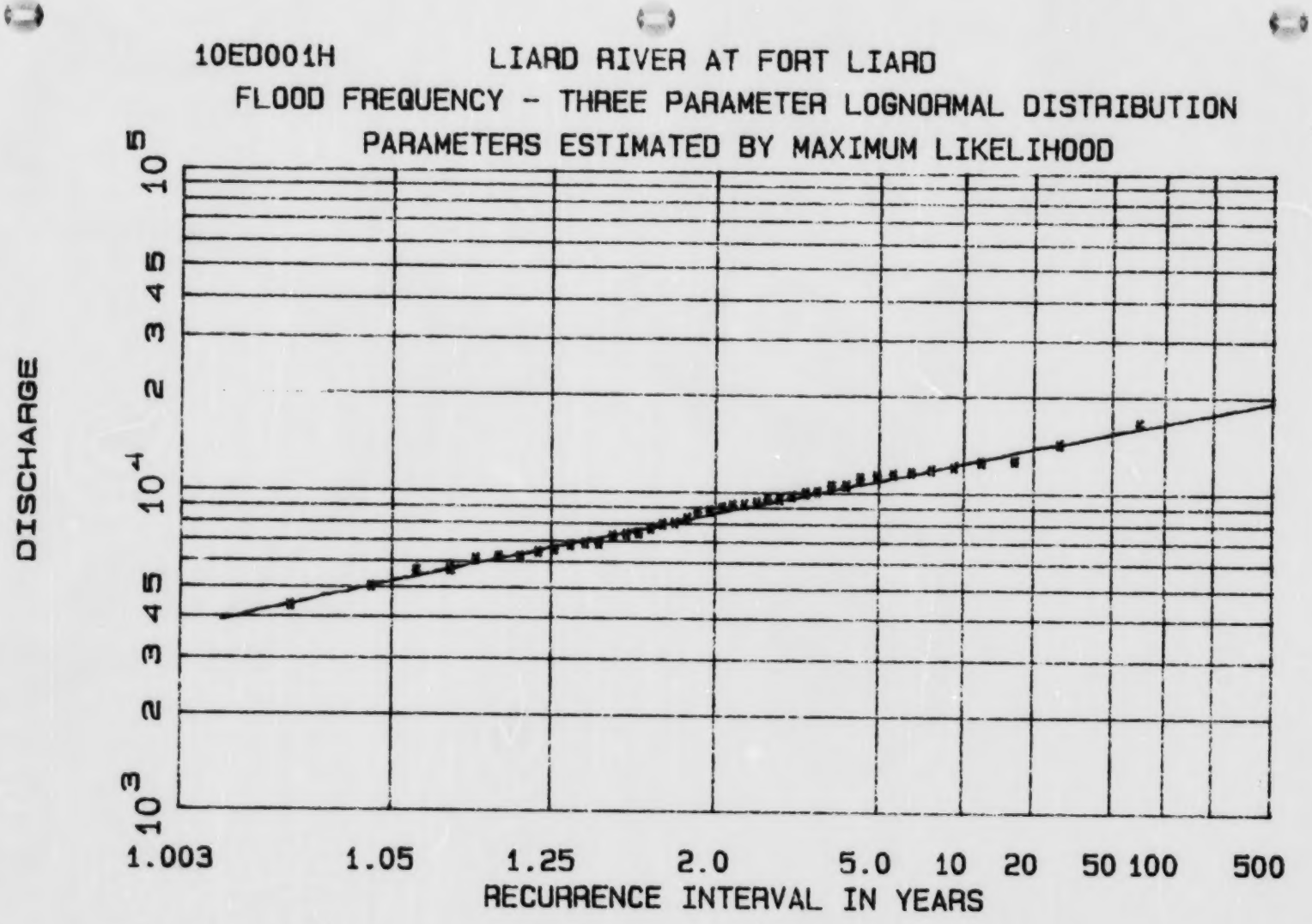
TOTAL SAMPLE SIZE= 42
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -788.065 M= 9.143 S= 0.269

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	3680.00
1.050	0.952	5190.00
1.250	0.800	6670.00
2.000	0.500	8570.00
5.000	0.200	10900.00
10.000	0.100	12400.00
20.000	0.050	13800.00
50.000	0.020	15400.00
100.000	0.010	16700.00
200.000	0.005	17900.00
500.000	0.002	19500.00


10ED001H
LIARD RIVER AT FORT LIARD
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3 2 3 4 5 10^4 2 3 4 5 10^5
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10ED002
WSC STATION NAME=LIARD RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1972	13600.000	16100.000	1	4.23	23.667
6	1973	15000.000	15000.000	2	11.27	8.875
7	1974	12900.000	14500.000	3	18.31	5.462
7	1975	14500.000	13600.000	4	25.35	3.944
7	1976	11100.000	13200.000	5	32.39	3.087
6	1977	16100.000	12900.000	6	39.44	2.536
6	1978	6120.000	12900.000	7	46.48	2.152
7	1979	13200.000	11300.000	8	53.52	1.868
7	1980	7010.000	11100.000	9	60.56	1.651
5	1981	11300.000	10600.000	10	67.61	1.479
5	1982	12900.000	10300.000	11	74.65	1.340
6	1983	8280.000	8280.000	12	81.69	1.224
6	1984	10600.000	7010.000	13	88.73	1.127
6	1985	10300.000	6120.000	14	95.77	1.044

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10ED002 LIARD RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	11636.429	2978.026	0.256	-0.484	3.320
LN X SERIES	9.327	0.287	0.031	-0.959	4.029
LN(A-X) SERIES	9.141	0.309	0.034	-0.086	3.286

X(MIN)= 6120.000
X(MAX)= 16100.000
LOWER OUTLIER LIMIT OF X= 5946.854

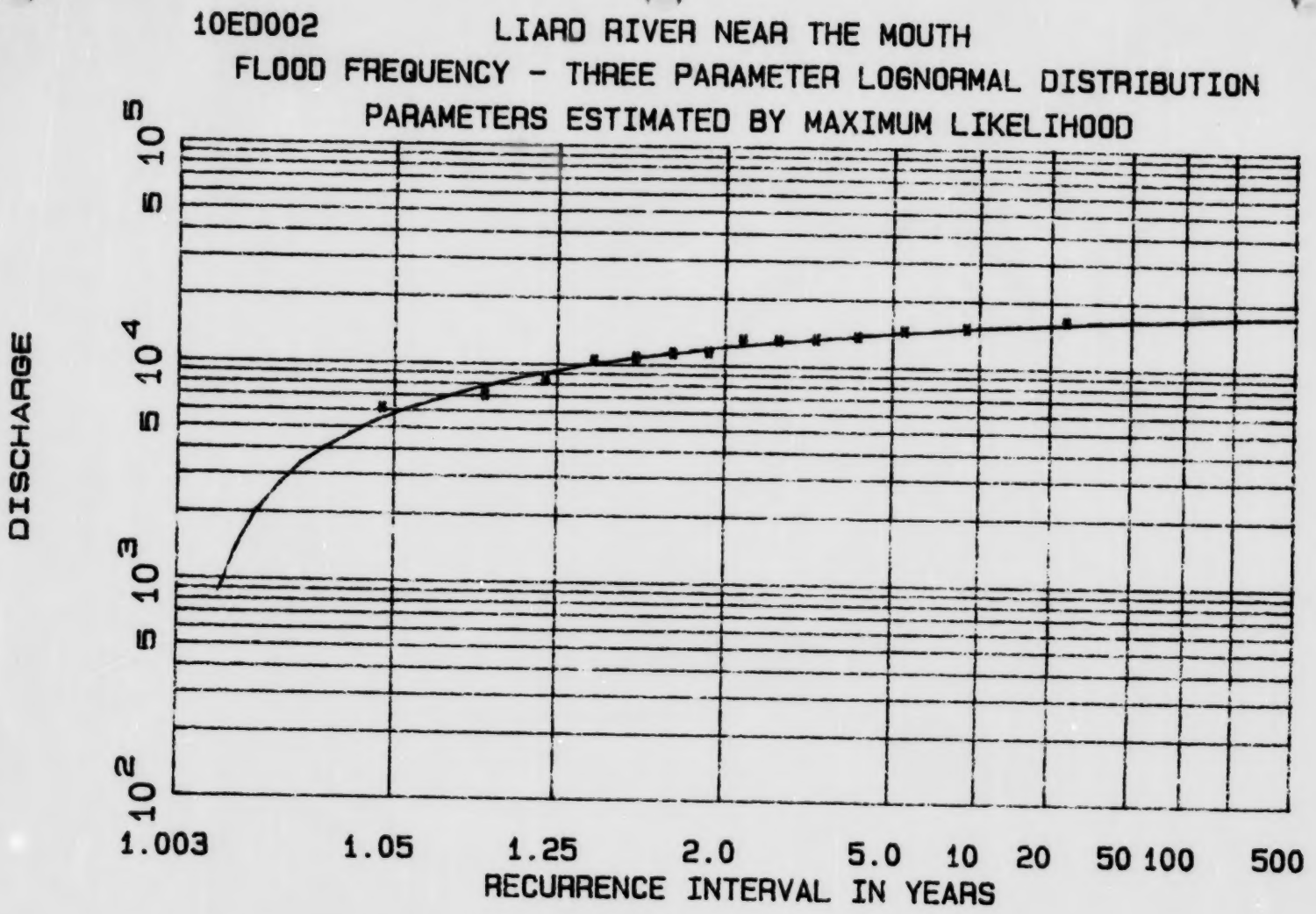
TOTAL SAMPLE SIZE= 14
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.2139E+05
3LN PARAMETERS: A= 21386.004 M= 9.141 S= 0.309

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	5770.00
1.250	0.800	9290.00
2.000	0.500	12100.00
5.000	0.200	14200.00
10.000	0.100	15100.00
20.000	0.050	15800.00
50.000	0.020	16400.00
100.000	0.010	16800.00
200.000	0.005	17200.00
500.000	0.002	17500.00


10ED002
LIARD RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^5
5 10^4
5 10^3
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07PB002
WSC STATION NAME=LITTLE BUFFALO RIVER NEAR PINE POINT HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1967	17.100	34.200	1	3.13	32.000
5	1968	31.400	31.400	2	8.33	12.000
5	1969	17.200	30.800	3	13.54	7.385
5	1970	12.700	22.900	4	18.75	5.333
5	1971	6.650	18.900	5	23.96	4.174
5	1972	6.850	17.200	6	29.17	3.429
8	1973	11.400	17.100	7	34.37	2.909
5	1974	18.900	16.000	8	39.58	2.526
8	1975	16.000	12.700	9	44.79	2.233
5	1976	22.900	12.500	10	50.00	2.000
5	1977	6.000	11.400	11	55.21	1.811
5	1978	9.970	9.970	12	60.42	1.655
5	1979	30.800	8.420	13	65.62	1.524
5	1980	8.420	7.970	14	70.83	1.412
99	1981	12.500	6.850	15	76.04	1.315
5	1982	2.150	6.650	16	81.25	1.231
5	1983	5.100	6.000	17	86.46	1.157
6	1984	7.970	5.100	18	91.67	1.091
5	1985	34.200	2.150*	19	96.87	1.032

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	14.643	9.415	0.643	0.888	3.442
LN X SERIES	2.471	0.708	0.287	-0.490	3.915

X(MIN)= 2.150
X(MAX)= 34.200
LOWER OUTLIER LIMIT OF X= 2.223

TOTAL SAMPLE SIZE= 19
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

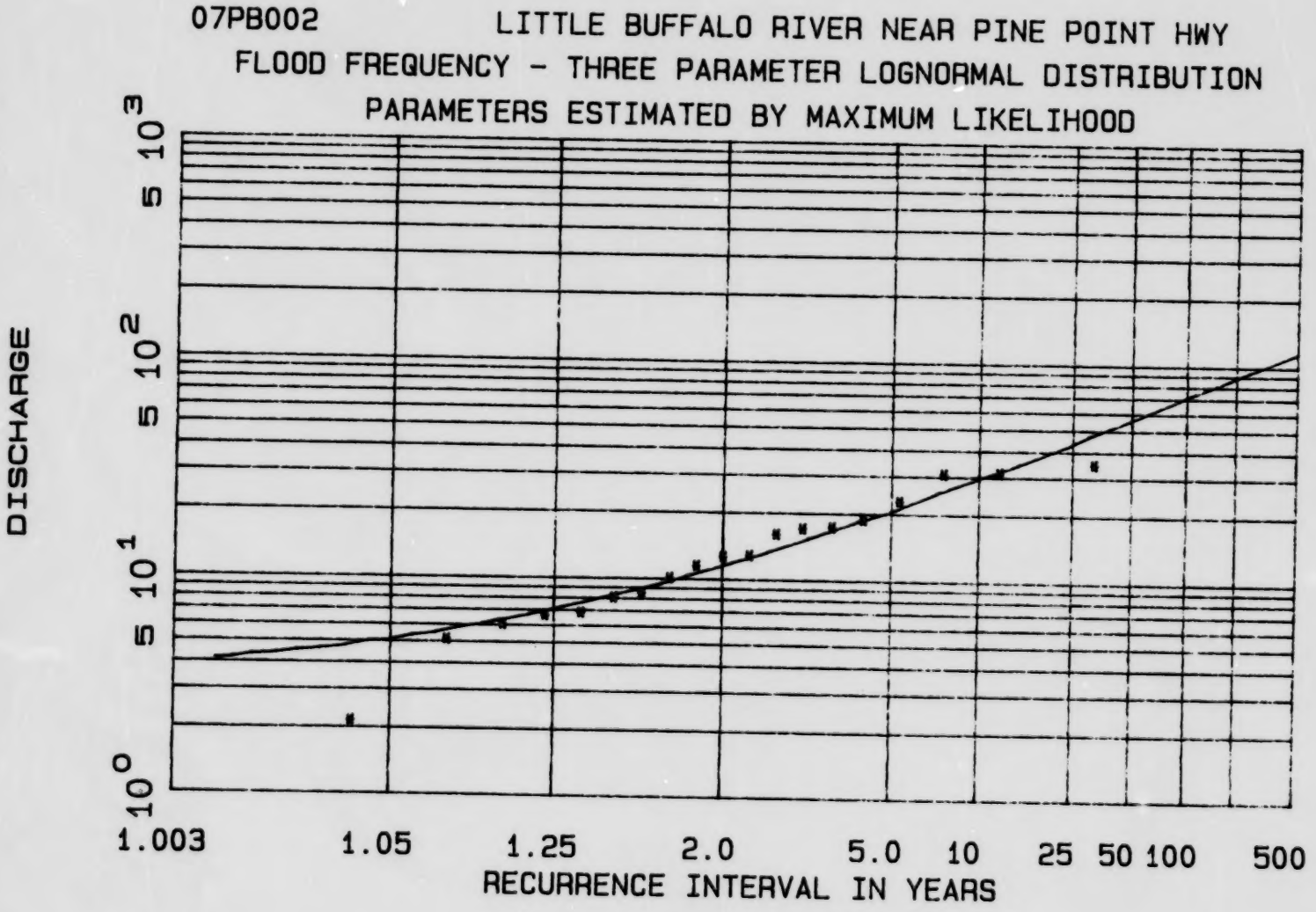
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	15.337	9.174	0.598	0.935	3.428
LN X SERIES	2.566	0.592	0.231	0.140	2.560
LN(X-A) SERIES	2.175	0.853	0.392	-0.232	2.742

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 3.345 M= 2.095 S= 0.911

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	4.01
1.050	0.952	5.12
1.250	0.800	7.12
2.000	0.500	11.50
5.000	0.200	20.80
10.000	0.100	29.50
20.000	0.050	39.70
50.000	0.020	56.20
100.000	0.010	71.10
200.000	0.005	88.30
500.000	0.002	115.00


07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	14.643	9.415	0.643	0.888	3.442
LN X SERIES	2.471	0.708	0.287	-0.490	3.915

X(MIN)= 2.150
X(MAX)= 34.200
LOWER OUTLIER LIMIT OF X= 2.223

TOTAL SAMPLE SIZE= 19
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

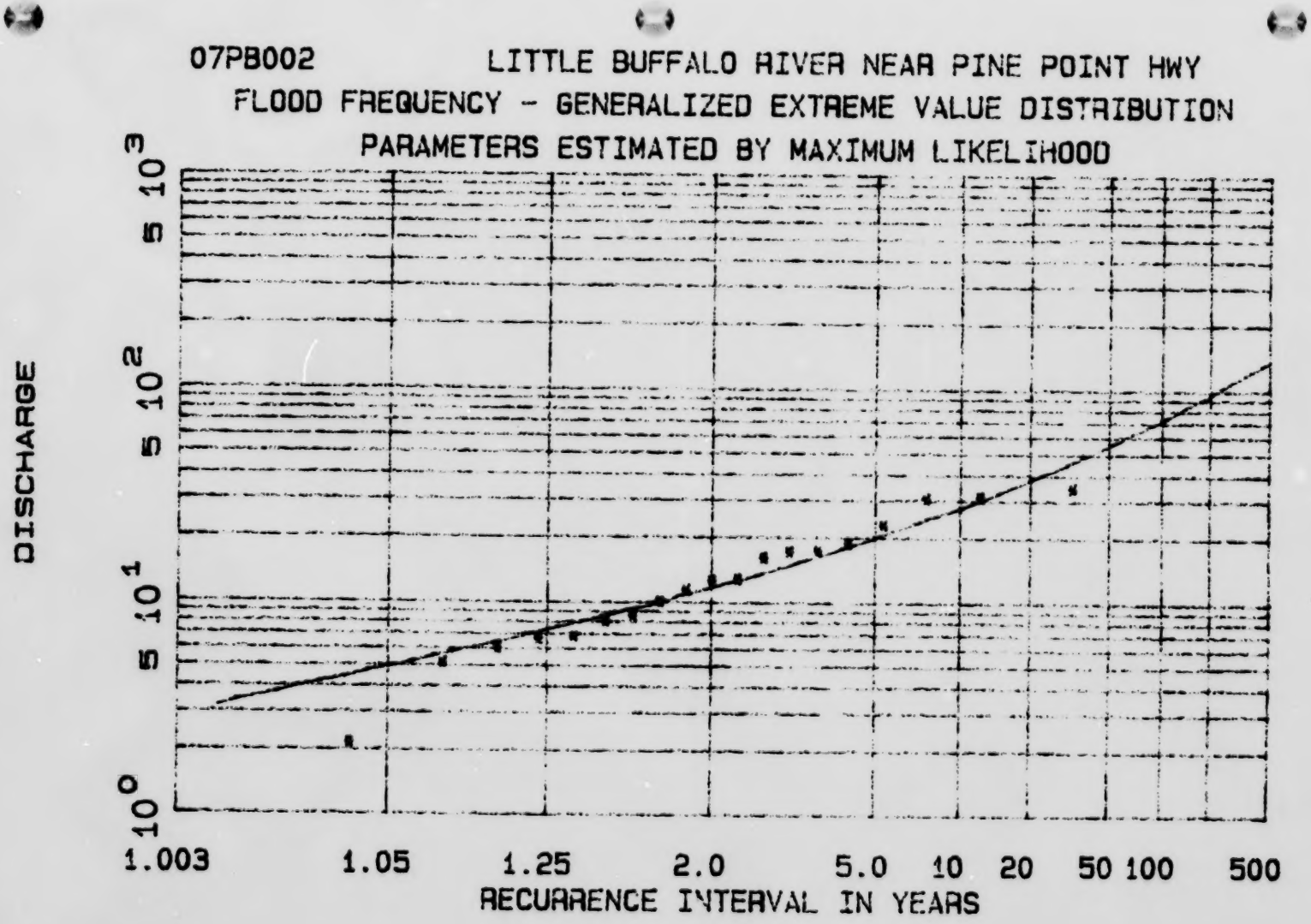
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	15.337	9.174	0.598	0.935	3.428
LN X SERIES	2.566	0.592	0.231	0.140	2.560

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE GEV WHICH DUPLICATES THE CONDITIONAL FUNCTION:
U= 9.66 A= 5.202 K= -0.372

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	2.94
1.050	0.952	4.92
1.250	0.800	7.39
2.000	0.500	11.70
5.000	0.200	20.10
10.000	0.100	28.00
20.000	0.050	37.90
50.000	0.020	55.30
100.000	0.010	73.00
200.000	0.005	95.80
500.000	0.002	137.00


07PB002
LITTLE BUFFALO RIVER NEAR PINE POINT HWY
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	14.643	9.415	0.643	0.888	3.442
LN X SERIES	2.471	0.708	0.287	-0.490	3.915

X(MIN)= 2.150
X(MAX)= 34.200
LOWER OUTLIER LIMIT OF X= 2.223

TOTAL SAMPLE SIZE= 19
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

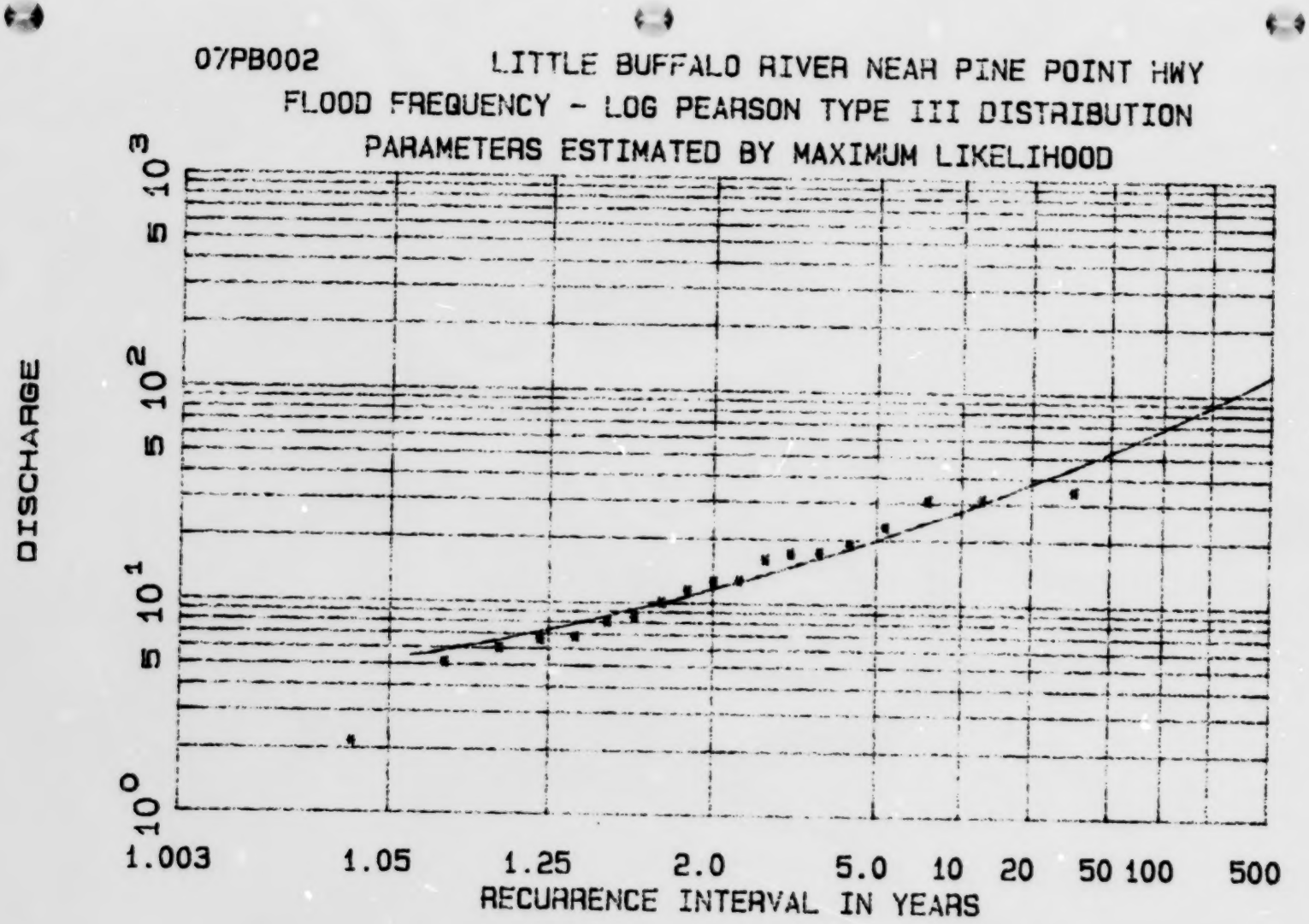
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	15.337	9.174	0.598	0.935	3.428
LN X SERIES	2.566	0.592	0.231	0.140	2.560

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE LP3 WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 0.2140 B= 8.011 LOG(M)= 0.8118 M = 2.252
SYNTHETIC STATISTICS: MEAN= 2.526 S.D.= 0.606 C.S.= 0.707

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	7.45
2.000	0.500	11.70
5.000	0.200	20.10
10.000	0.100	28.00
20.000	0.050	37.60
50.000	0.020	53.80
100.000	0.010	69.50
200.000	0.005	88.90
500.000	0.002	122.00


07PB002
LITTLE BUFFALO RIVER NEAR PINE POINT HWY
FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	14.643	9.415	0.643	0.888	3.442
LN X SERIES	2.471	0.708	0.287	-0.490	3.915

X(MIN)= 2.150
X(MAX)= 34.200
LOWER OUTLIER LIMIT OF X= 2.223

TOTAL SAMPLE SIZE= 19
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	15.337	9.174	0.598	0.935	3.428
LN X SERIES	2.566	0.592	0.231	0.140	2.560

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B. ASSUMING M TO BE NON-ZERO.

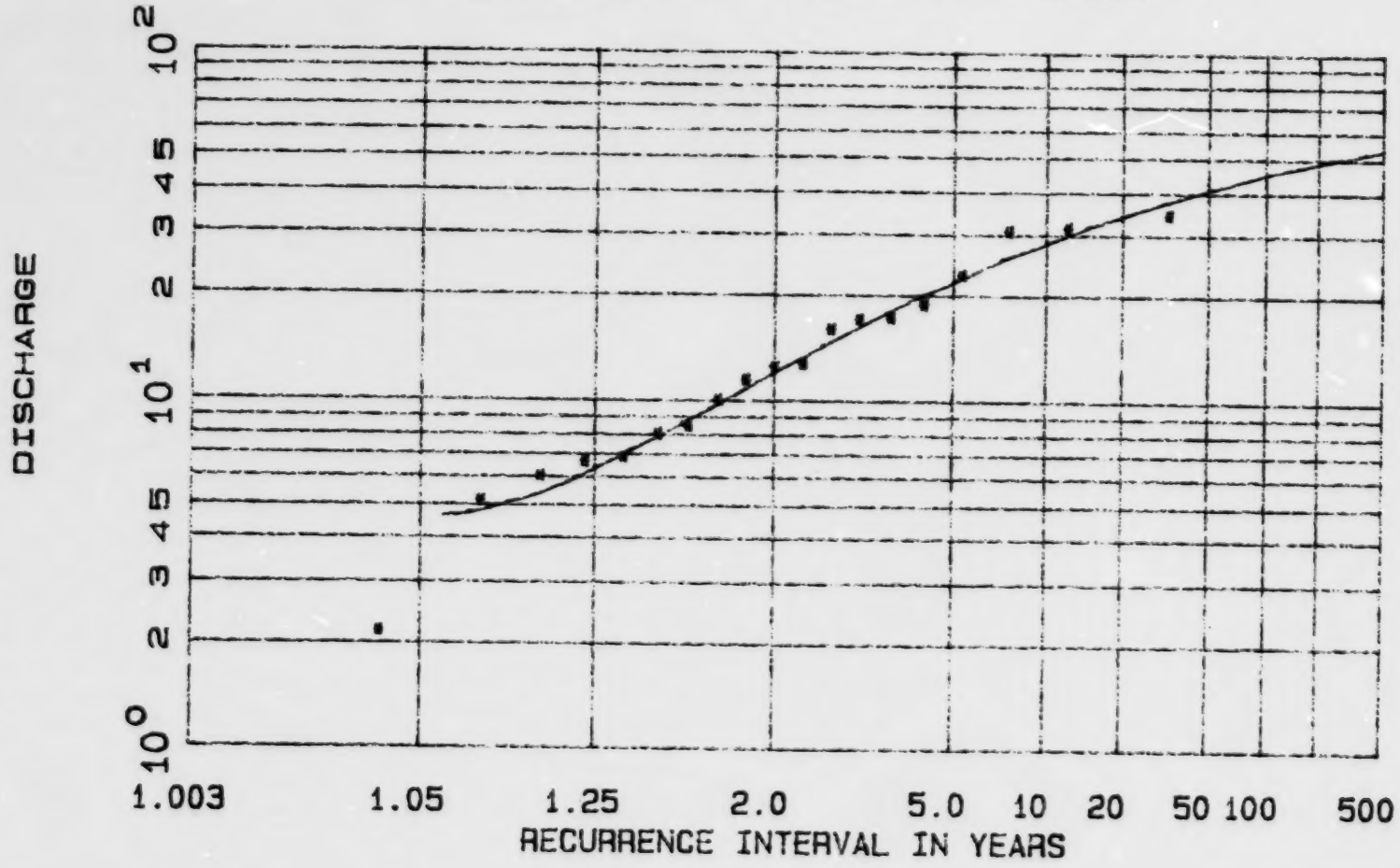
M= 4.609 A= -0.490 B= 20.18 C= -74.132 D=-0.178
DISTRIBUTION IS UPPER BOUNDED AT E= 0.7825E+02

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	6.33
2.000	0.500	12.10
5.000	0.200	22.00
10.000	0.100	28.60
20.000	0.050	34.30
50.000	0.020	40.90
100.000	0.010	45.30
200.000	0.005	49.10
500.000	0.002	53.50

07PB002 LITTLE BUFFALO RIVER NEAR PINE POINT HWY

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=07RD001
WSC STATION NAME=LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
8	1965	169.000	200.000	1	2.83	35.333
9	1966	166.000	191.000	2	7.55	13.250
9	1967	162.000	180.000	3	12.26	8.154
10	1968	191.000	178.000	4	16.98	5.889
11	1969	168.000	177.000	5	21.70	4.609
10	1970	168.000	173.000	6	26.42	3.786
9	1971	177.000	169.000	7	31.13	3.212
9	1972	156.000	168.000	8	35.85	2.789
9	1973	132.000	168.000	9	40.57	2.465
8	1974	128.000	166.000	10	45.28	2.208
8	1975	173.000	165.000	11	50.00	2.000
8	1976	121.000	162.000	12	54.72	1.828
8	1977	165.000	156.000	13	59.43	1.683
8	1978	136.000	149.000	14	64.15	1.559
8	1979	149.000	136.000	15	68.87	1.452
8	1980	79.000	132.000	16	73.58	1.359
8	1981	116.000	128.000	17	78.30	1.277
9	1982	119.000	121.000	18	83.02	1.205
10	1983	178.000	119.000	19	87.74	1.140
8	1984	180.000	116.000	20	92.45	1.082
7	1985	200.000	79.000*	21	97.17	1.029

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07RD001 LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	153.952	29.554	0.192	-0.806	3.971
LN X SERIES	5.016	0.217	0.043	-1.408	6.014

X(MIN)= 79.000
X(MAX)= 200.000
LOWER OUTLIER LIMIT OF X= 89.361

TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

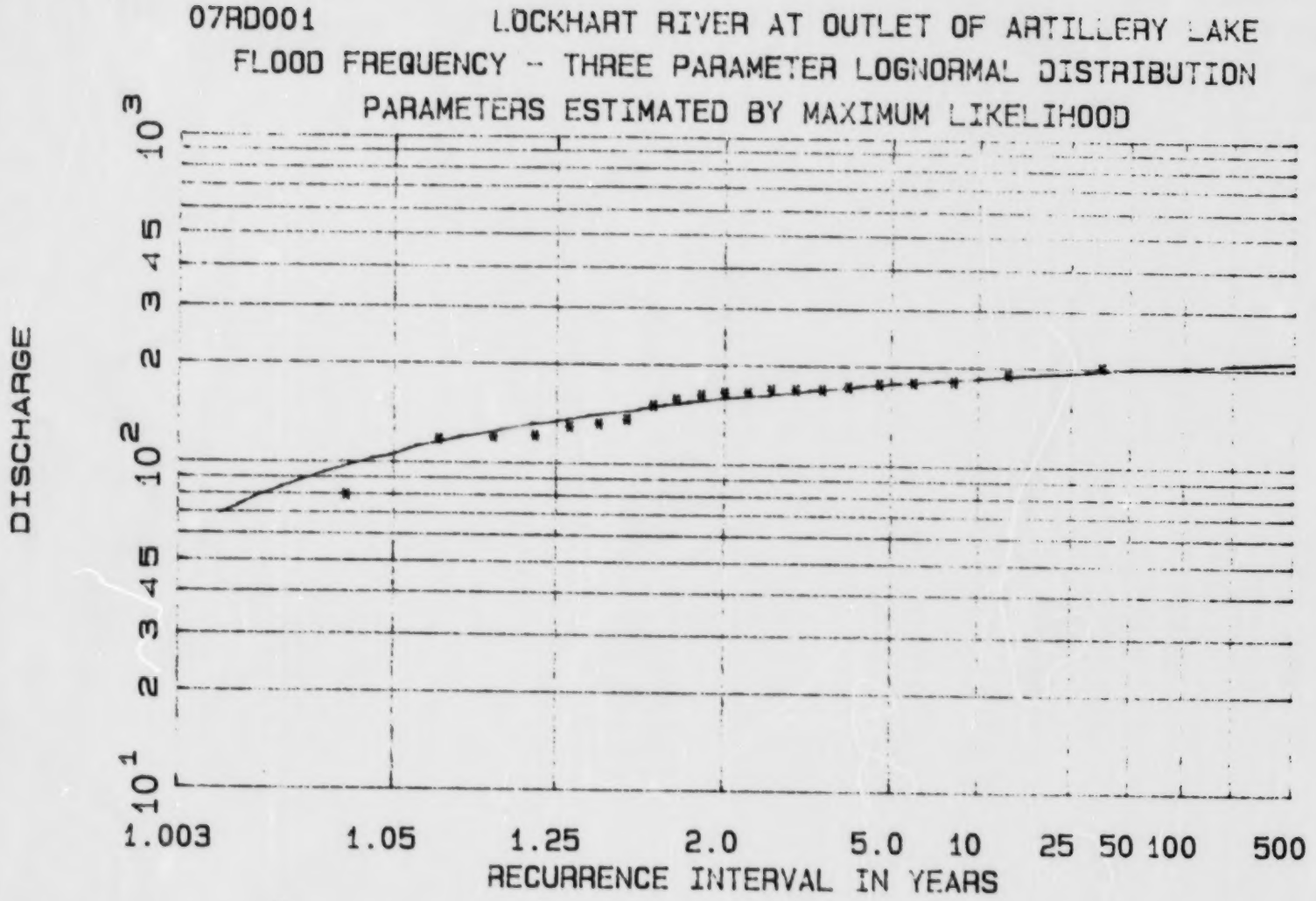
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	157.700	24.677	0.156	-0.336	2.652
LN X SERIES	5.048	0.163	0.032	-0.555	2.680
LN(A-X) SERIES	4.645	0.233	0.050	-0.079	2.994

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.2644E+03
PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 264.444 M= 4.661 S= 0.241

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	59.50
1.050	0.952	106.00
1.250	0.800	135.00
2.000	0.500	159.00
5.000	0.200	178.00
10.000	0.100	187.00
20.000	0.050	193.00
50.000	0.020	200.00
100.000	0.010	204.00
200.000	0.005	208.00
500.000	0.002	212.00


07RD001 LOCKHART RIVER AT OUTLET OF ARTILLERY LAKE
FLOOD FREQUENCY -- THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10LA003
WSC STATION NAME=MACKENZIE R. ABOVE ARTIC RED RIVER

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1973	26600.000	34000.000	1	4.55	22.000
5	1974	30300.000	32000.000	2	12.12	8.250
5	1975	34000.000	31300.000	3	19.70	5.077
5	1976	32000.000	30300.000	4	27.27	3.667
6	1977	29200.000	29200.000	5	34.85	2.870
6	1978	28300.000	29000.000	6	42.42	2.357
5	1979	28600.000	28800.000	7	50.00	2.000
5	1980	26400.000	28600.000	8	57.58	1.737
5	1981	28300.000	28300.000	9	65.15	1.535
6	1982	28800.000	28300.000	10	72.73	1.375
6	1983	29000.000	26600.000	11	80.30	1.245
6	1984	22100.000	26400.000	12	87.88	1.138
99	1985	31300.000	22100.000*	13	95.45	1.048

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10LA003 MACKENZIE R. ABOVE ARTIC RED RIVER

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	28838.461	2915.344	0.101	-0.576	5.675
LN X SERIES	10.265	0.105	0.010	-1.000	6.485

X(MIN)= 22100.000
X(MAX)= 34000.000
LOWER OUTLIER LIMIT OF X=22827.512

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

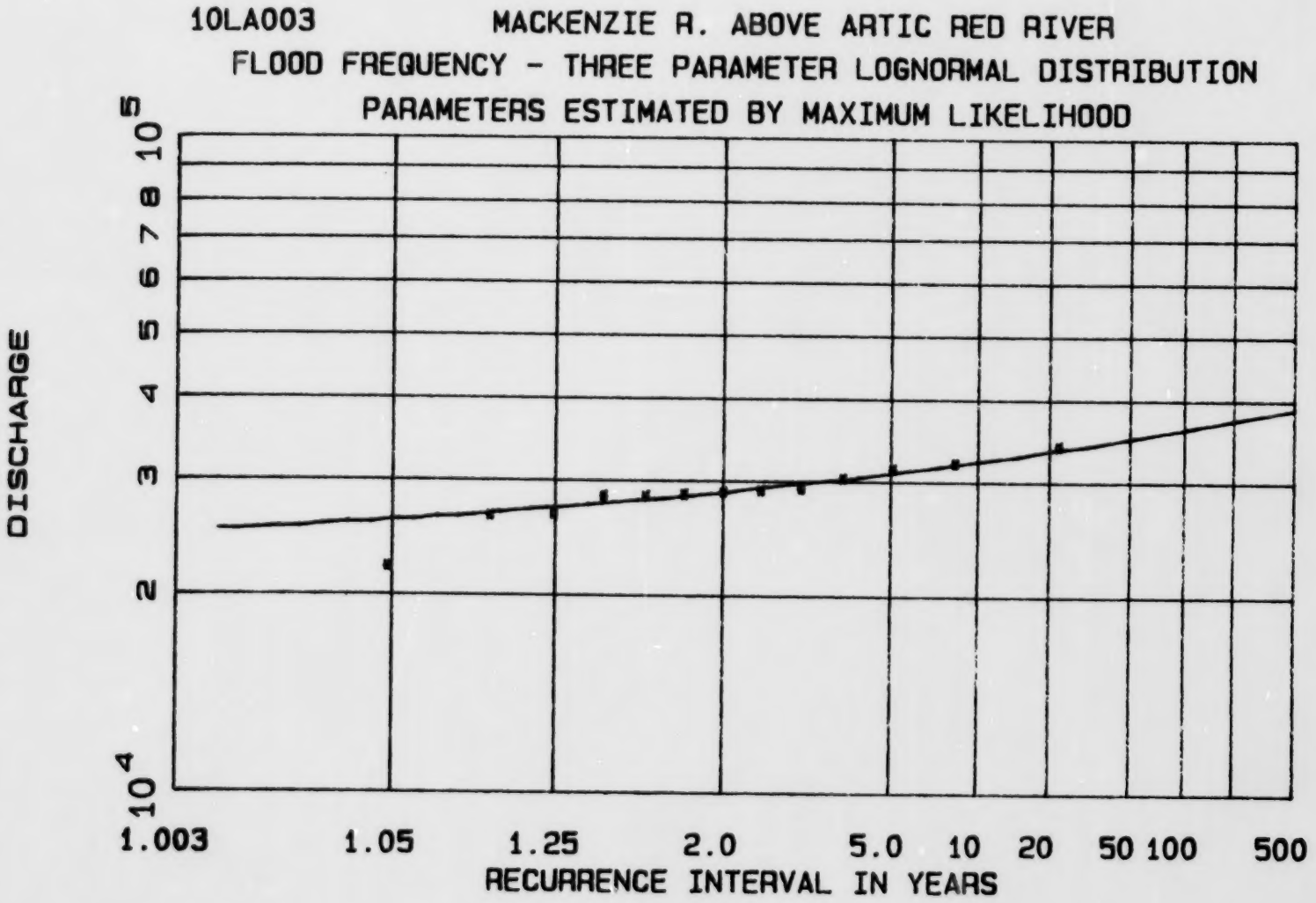
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	29400.000	2190.890	0.075	0.727	4.467
LN X SERIES	10.286	0.073	0.007	0.556	4.226
LN(X-A) SERIES	8.855	0.297	0.034	0.020	3.937

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 22098.850 M= 8.820 S= 0.318

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	24900.00
1.050	0.952	26100.00
1.250	0.800	27300.00
2.000	0.500	28900.00
5.000	0.200	30900.00
10.000	0.100	32300.00
20.000	0.050	33500.00
50.000	0.020	35100.00
100.000	0.010	36300.00
200.000	0.005	37400.00
500.000	0.002	39000.00


10LA003
MACKENZIE R. ABOVE ARTIC RED RIVER
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4 2 3 4 5 6 7 8 10^5
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10GC001
WSC STATION NAME=MACKENZIE R. AT FORT SIMPSON

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1965	16400.000	22900.000	1	2.83	35.333
6	1966	14800.000	21900.000	2	7.55	13.250
6	1967	17000.000	20800.000	3	12.26	8.154
6	1968	17500.000	20800.000	4	16.98	5.889
6	1969	13300.000	20700.000	5	21.70	4.609
6	1970	14700.000	20300.000	6	26.42	3.786
6	1971	16500.000	18500.000	7	31.13	3.212
6	1972	17900.000	18400.000	8	35.85	2.789
6	1973	20800.000	17900.000	9	40.57	2.465
7	1974	20300.000	17500.000	10	45.28	2.208
7	1975	21900.000	17000.000	11	50.00	2.000
7	1976	18400.000	16700.000	12	54.72	1.828
6	1977	22900.000	16600.000	13	59.43	1.683
6	1978	13400.000	16500.000	14	64.15	1.559
7	1979	20800.000	16400.000	15	68.87	1.452
6	1980	12500.000	15300.000	16	73.58	1.359
6	1981	16600.000	14800.000	17	78.30	1.277
5	1982	20700.000	14700.000	18	83.02	1.205
6	1983	15300.000	13400.000	19	87.74	1.140
6	1984	16700.000	13300.000	20	92.45	1.082
6	1985	18500.000	12500.000	21	97.17	1.029

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10GC001 MACKENZIE R. AT FORT SIMPSON

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	17471.428	2946.717	0.169	0.134	2.685
LN X SERIES	9.755	0.171	0.018	-0.162	2.758
LN(X-A) SERIES	10.330	0.096	0.009	-0.030	2.697

X(MIN)= 12500.000
X(MAX)= 22900.000
LOWER OUTLIER LIMIT OF X=11423.617

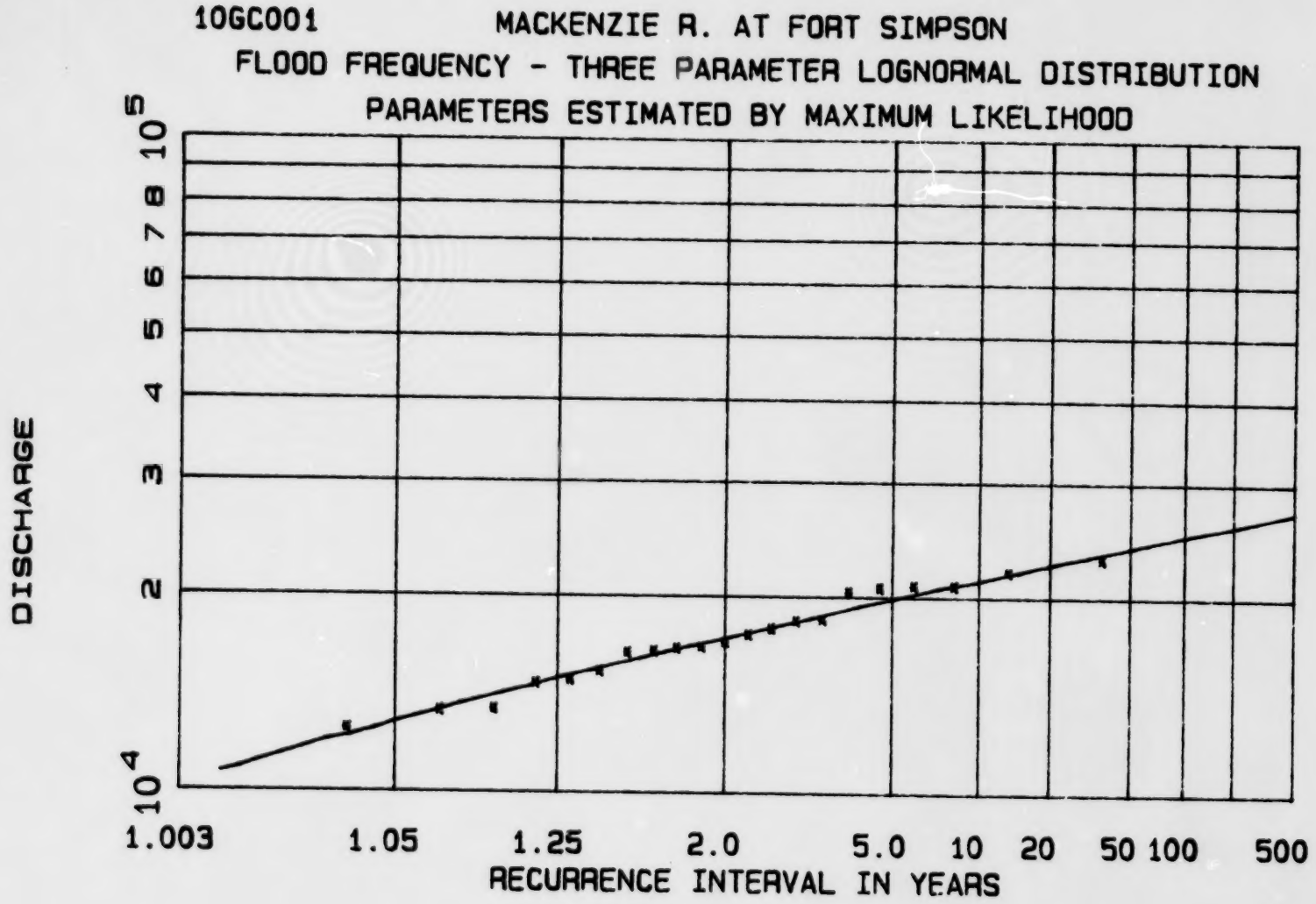
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A=-13308.938 M=10.330 S= 0.096

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	10200.00
1.050	0.952	12800.00
1.250	0.800	15000.00
2.000	0.500	17300.00
5.000	0.200	19900.00
10.000	0.100	21300.00
20.000	0.050	22600.00
50.000	0.020	24000.00
100.000	0.010	25000.00
200.000	0.005	25900.00
500.000	0.002	27100.00


10GC001
MACKENZIE R. AT FORT SIMPSON
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4 2 3 4 5 6 7 8 10^5
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10LC002
WSC STATION NAME=MACKENZIE R. (EAST CHANNEL) AT INUVIK

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1974	889.000	923.000	1	4.92	20.333
6	1975	923.000	910.000	2	13.11	7.625
5	1976	708.000	890.000	3	21.31	4.692
5	1977	793.000	889.000	4	29.51	3.389
6	1978	603.000	878.000	5	37.70	2.652
5	1979	807.000	840.000	6	45.90	2.179
6	1980	570.000	807.000	7	54.10	1.848
5	1981	890.000	793.000	8	62.30	1.605
6	1982	840.000	708.000	9	70.49	1.419
6	1983	878.000	650.000	10	78.69	1.271
5	1984	650.000	603.000	11	86.89	1.151
6	1985	910.000	570.000	12	95.08	1.052

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	788.417	125.080	0.159	-0.714	3.022
LN X SERIES	6.657	0.169	0.025	-0.858	3.304
LN(A-X) SERIES	6.259	0.224	0.036	0.520	2.760

X(MIN)= 570.000
X(MAX)= 923.000
LOWER OUTLIER LIMIT OF X= 542.753

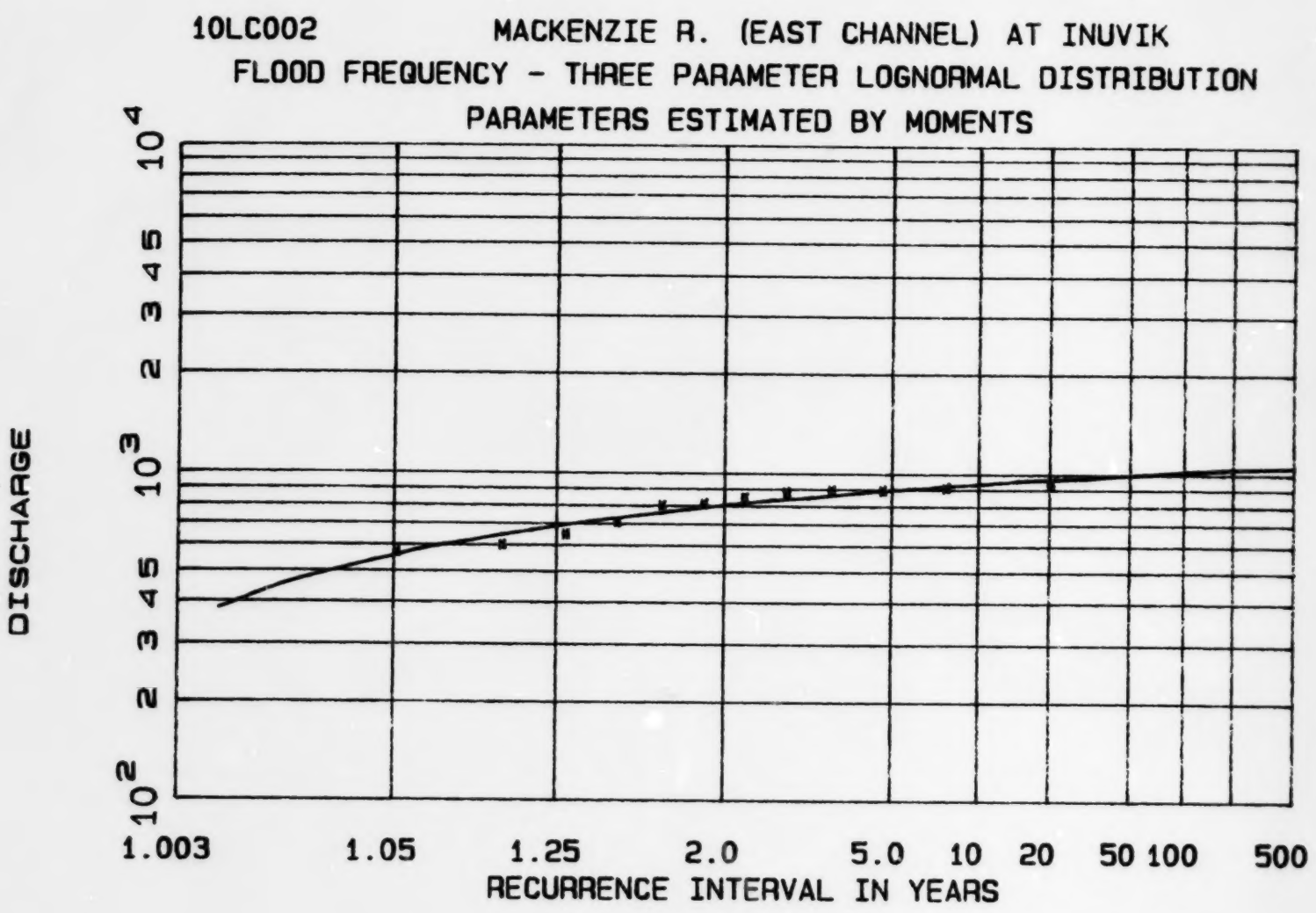
TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT A= 0.1324E+04
3LN PARAMETERS: A= 1323.736 M= 6.256 S= 0.231

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	341.00
1.050	0.952	558.00
1.250	0.800	691.00
2.000	0.500	802.00
5.000	0.200	894.00
10.000	0.100	936.00
20.000	0.050	967.00
50.000	0.020	999.00
100.000	0.010	1020.00
200.000	0.005	1040.00
500.000	0.002	1060.00


10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	788.417	125.080	0.159	-0.714	3.022
LN X SERIES	6.657	0.169	0.025	-0.858	3.304

X(MIN)= 570.000
X(MAX)= 923.000
LOWER OUTLIER LIMIT OF X= 542.753

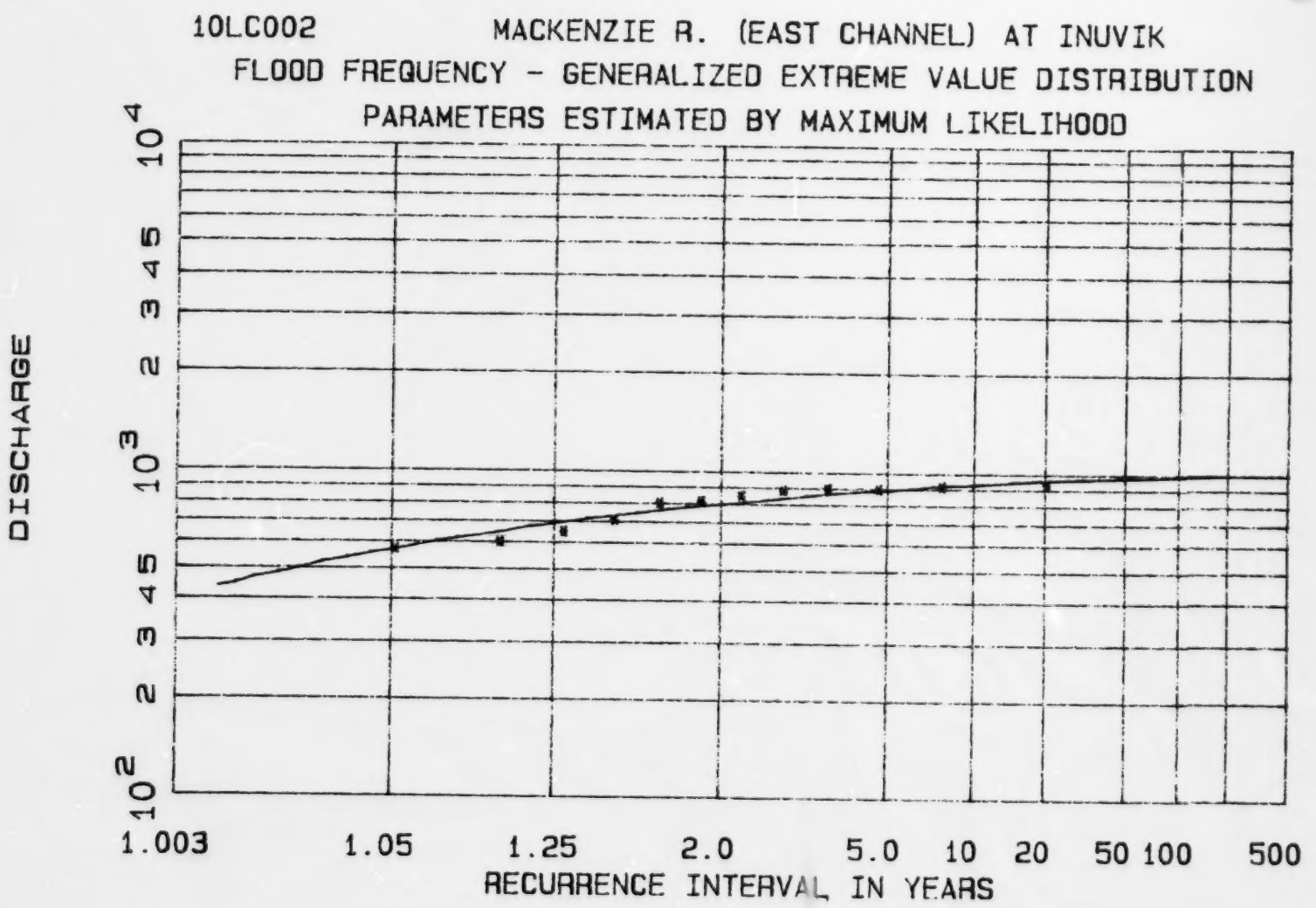
TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT (U+A/K)= 0.1015E+04
GEV PARAMETERS: U= 757.69 A= 126.053 K= 0.490

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	405.00
1.050	0.952	571.00
1.250	0.800	690.00
2.000	0.500	800.00
5.000	0.200	892.00
10.000	0.100	929.00
20.000	0.050	955.00
50.000	0.020	977.00
100.000	0.010	988.00
200.000	0.005	996.00
500.000	0.002	1000.00


10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^2 2 3 4 5 10^3 2 3 4 5 10^4
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	788.417	125.080	0.159	-0.714	3.022
LN X SERIES	6.657	0.169	0.025	-0.858	3.304

X(MIN)= 570.000
X(MAX)= 923.000
LOWER OUTLIER LIMIT OF X= 542.753

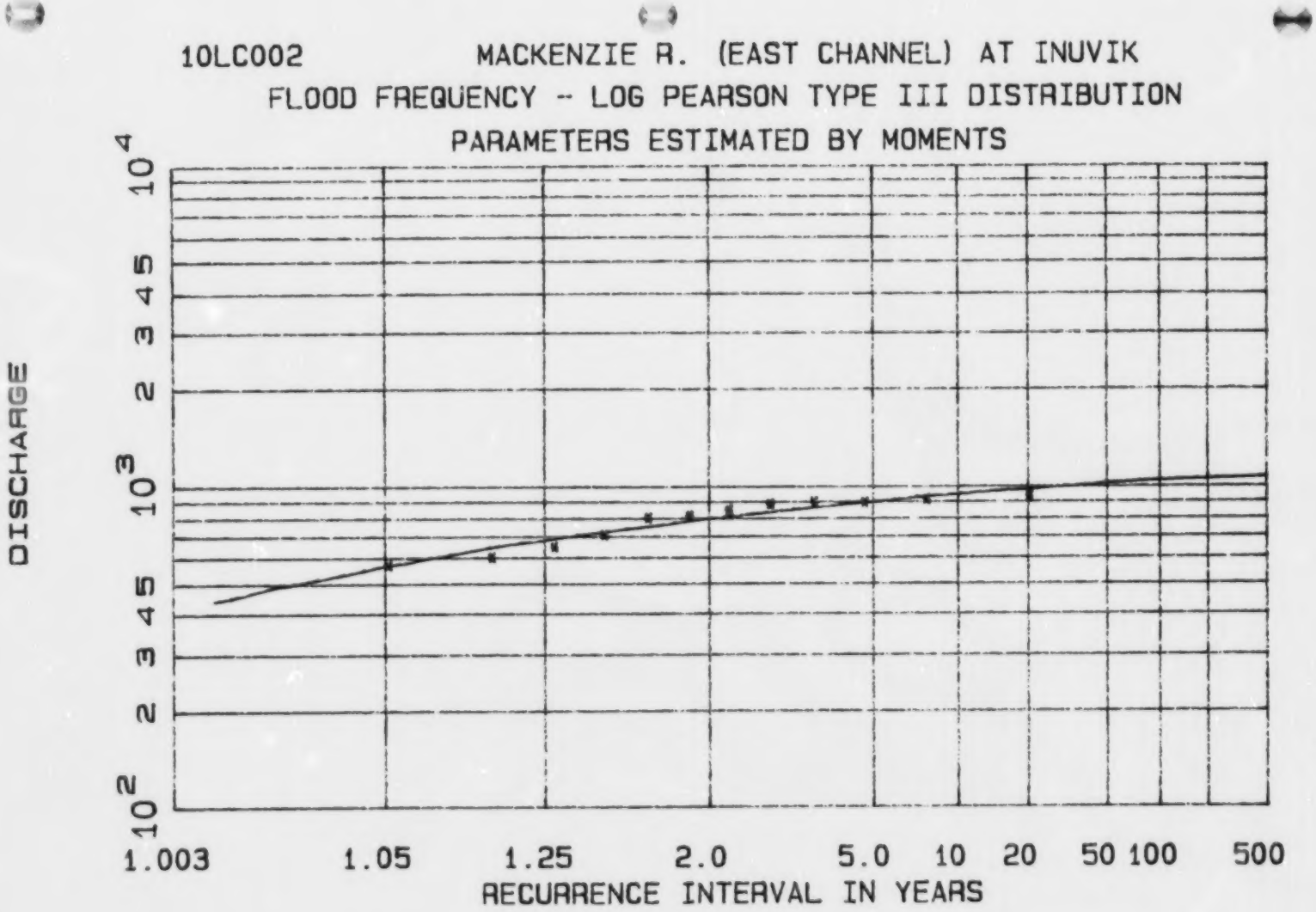
TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT M= 1155.
LP3 PARAMETERS: A=-0.7258E-01 B= 5.432 LOG(M)= 7.052
M = 1155.

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	417.00
1.050	0.952	566.00
1.250	0.800	683.00
2.000	0.500	797.00
5.000	0.200	899.00
10.000	0.100	946.00
20.000	0.050	982.00
50.000	0.020	1020.00
100.000	0.010	1040.00
200.000	0.005	1060.00
500.000	0.002	1070.00


10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK
FLOOD FREQUENCY -- LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	788.417	125.080	0.159	-0.714	3.022
LN X SERIES	6.657	0.169	0.025	-0.858	3.304

X(MIN)= 570.000
X(MAX)= 923.000
LOWER OUTLIER LIMIT OF X= 542.753

TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED BY ASSUMING M TO BE NON-ZERO. THE ITERATION ALGORITHM WAS NOT REQUIRED.

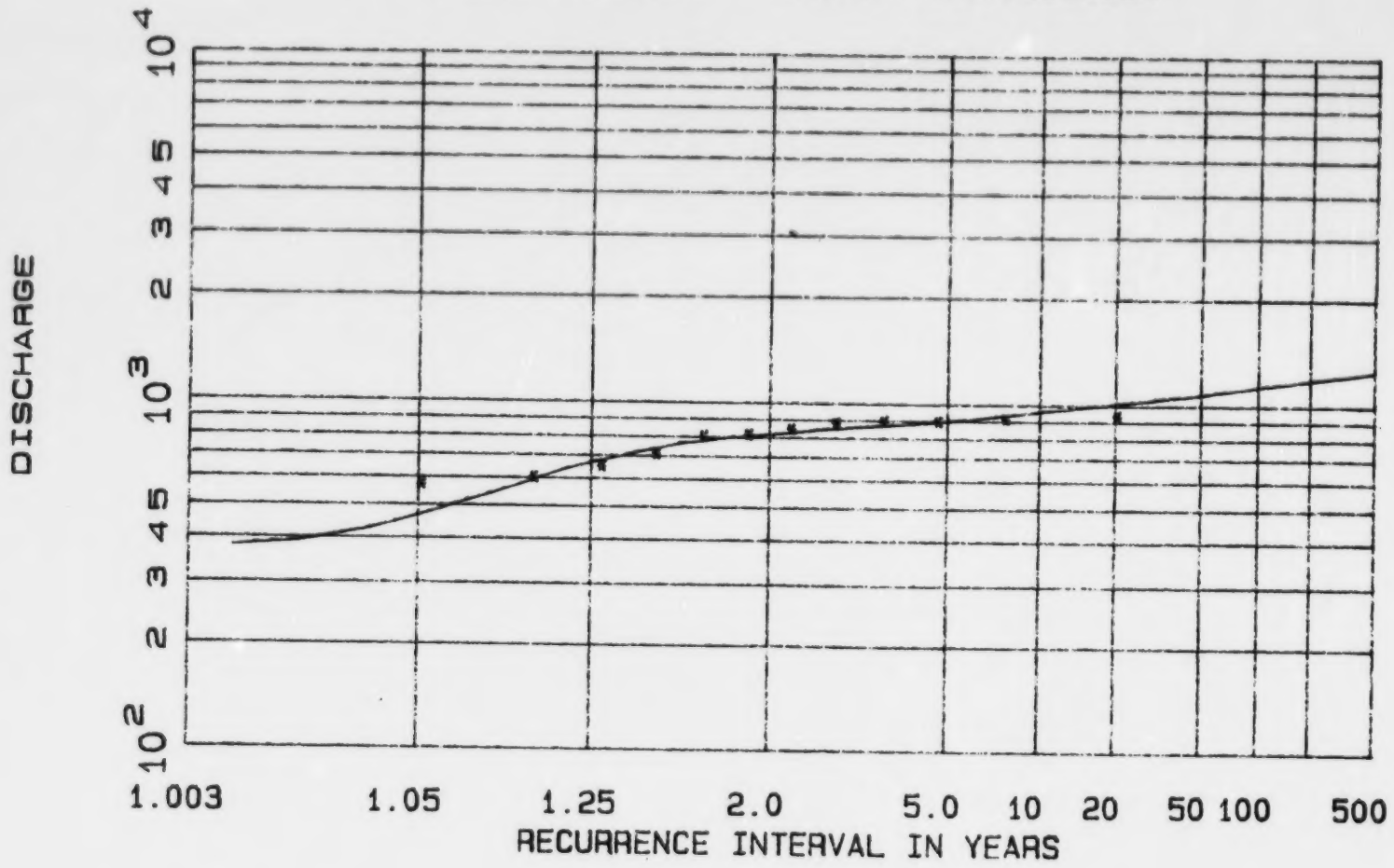
M= 366.216 A= 400.170 B= 5.57 C= -3560.889 D=-0.024
DISTRIBUTION IS UPPER BOUNDED AT E= 0.4327E+04

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	373.00
1.050	0.952	466.00
1.250	0.800	670.00
2.000	0.500	816.00
5.000	0.200	900.00
10.000	0.100	957.00
20.000	0.050	1010.00
50.000	0.020	1080.00
100.000	0.010	1140.00
200.000	0.005	1190.00
500.000	0.002	1260.00

10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



FREQUENCY ANALYSIS - WEIBULL DISTRIBUTION
10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	788.417	125.080	0.159	-0.714	3.022
LN X SERIES	6.657	0.169	0.025	-0.858	3.304

X(MIN)= 570.000
X(MAX)= 923.000
LOWER OUTLIER LIMIT OF X= 542.753

TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

WEIBULL PARAMETERS

1/A =0.08266 E = -456.86 U = 842.23

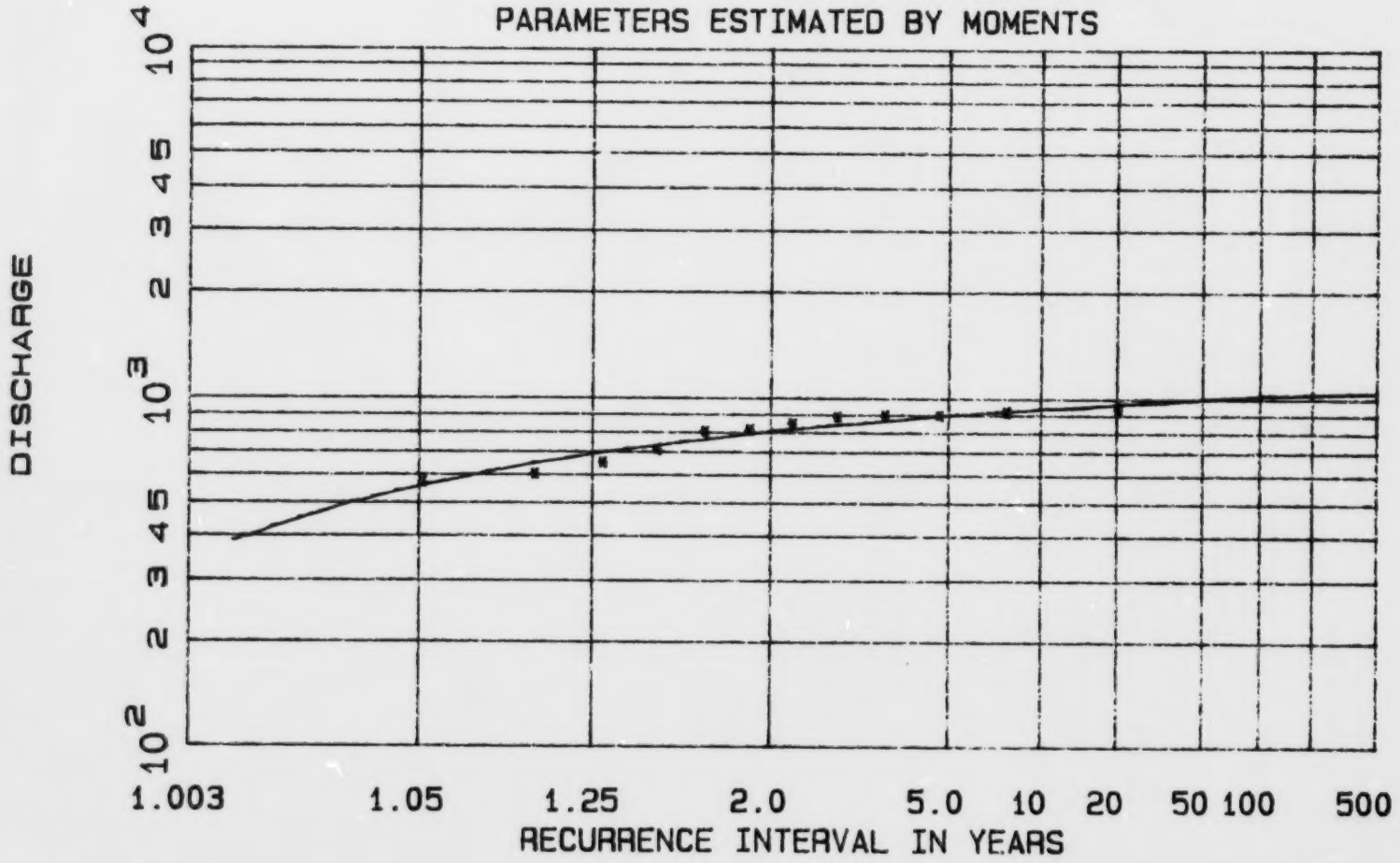
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	347.00
1.050	0.952	555.00
1.250	0.800	691.00
2.000	0.500	803.00
5.000	0.200	894.00
10.000	0.100	935.00
20.000	0.050	966.00
50.000	0.020	997.00
100.000	0.010	1020.00
200.000	0.005	1030.00
500.000	0.002	1050.00

10LC002 MACKENZIE R. (EAST CHANNEL) AT INUVIK

FLOOD FREQUENCY - WEIBULL DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



WSC STATION NO=10KA001
WSC STATION NAME=MACKENZIE R. AT NORMAN WELLS

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1965	19300.000	30300.000	1	2.83	35.333
6	1966	20800.000	28300.000	2	7.55	13.250
6	1967	22500.000	28200.000	3	12.26	8.154
6	1968	25000.000	27500.000	4	16.98	5.889
6	1969	17400.000	26900.000	5	21.70	4.609
7	1970	20600.000	25500.000	6	26.42	3.786
6	1971	21500.000	25000.000	7	31.13	3.212
7	1972	25500.000	25000.000	8	35.85	2.789
6	1973	24800.000	25000.000	9	40.57	2.465
5	1974	27500.000	24900.000	10	45.28	2.208
5	1975	30300.000	24800.000	11	50.00	2.000
7	1976	22000.000	24100.000	12	54.72	1.828
5	1977	28300.000	22500.000	13	59.43	1.683
5	1978	24100.000	22000.000	14	64.15	1.559
7	1979	24900.000	21500.000	15	68.87	1.452
99	1980	21500.000	21500.000	16	73.58	1.359
99	1981	25000.000	20800.000	17	78.30	1.277
5	1982	26900.000	20600.000	18	83.02	1.205
5	1983	25000.000	19800.000	19	87.74	1.140
6	1984	19800.000	19300.000	20	92.45	1.082
5	1985	28200.000	17400.000	21	97.17	1.029

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10KA001 MACKENZIE R. AT NORMAN WELLS

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	23852.381	3365.802	0.141	-0.002	2.875
LN X SERIES	10.070	0.144	0.014	-0.284	3.010
LN(A-X) SERIES	15.596	0.001	0.000	0.001	2.875

X(MIN)= 17400.000
X(MAX)= 30300.000
LOWER OUTLIER LIMIT OF X=16718.031

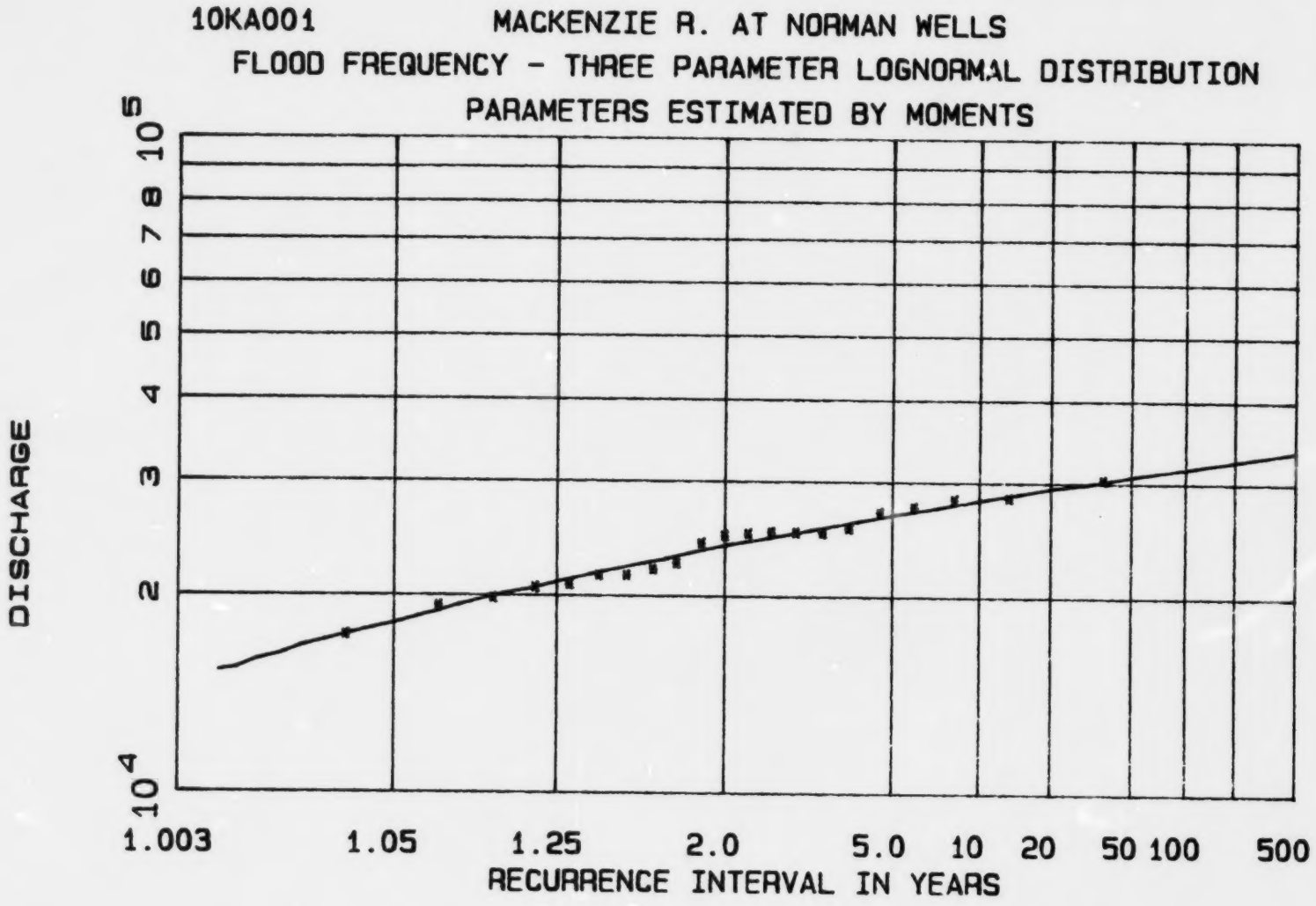
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT A= 0.5957E+07
3LN PARAMETERS: A=********** M=15.596 S= 0.001

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	14600.00
1.050	0.952	18200.00
1.250	0.800	21000.00
2.000	0.500	23900.00
5.000	0.200	26700.00
10.000	0.100	28200.00
20.000	0.050	29400.00
50.000	0.020	30800.00
100.000	0.010	31700.00
200.000	0.005	32500.00
500.000	0.002	33500.00


10KA001
MACKENZIE R. AT NORMAN WELLS
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^4 2 3 4 5 6 7 8 10^5
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

STATION NO=10FB001
WSC STATION NAME=MACKENZIE R. NEAR FORT PROVIDENCE

MONTH (1)	YEAR (2)	DATA (3) (CMS)	ORDERED (4) (CMS)	RANK (5)	PROB. (6) (%)	RET. PERIOD (7) (YEARS)
8	1962	8920.000	11430.000	1	2.48	40.333
7	1963	8500.000	9480.000	2	6.61	15.125
7	1964	8830.000	8920.000	3	10.74	9.308
7	1965	8690.000	8920.000	4	14.88	6.722
7	1966	7960.000	8830.000	5	19.01	5.261
7	1967	8610.000	8690.000	6	23.14	4.321
7	1968	7110.000	8610.000	7	27.27	3.667
6	1969	6540.000	8500.000	8	31.40	3.184
6	1970	6140.000	8410.000	9	35.54	2.814
6	1971	5860.000	8100.000	10	39.67	2.521
7	1972	6650.000	8070.000	11	43.80	2.283
8	1973	7250.000	7960.000	12	47.93	2.086
7	1974	8070.000	7900.000	13	52.07	1.921
6	1975	7900.000	7870.000	14	56.20	1.779
6	1976	7870.000	7390.000	15	60.33	1.658
6	1977	7390.000	7250.000	16	64.46	1.551
6	1978	6460.000	7110.000	17	68.60	1.458
99	1979	8920.000	6650.000	18	72.73	1.375
99	1980	8410.000	6570.000	19	76.86	1.301
99	1981	8100.000	6540.000	20	80.99	1.235
99	1982	11430.000	6460.000	21	85.12	1.175
99	1983	6370.000	6370.000	22	89.26	1.120
99	1984	6570.000	6140.000	23	93.39	1.071
99	1985	9480.000	5860.000	24	97.52	1.025

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10FB001 MACKENZIE R. NEAR FORT PROVIDENCE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	7834.583	1281.701	0.164	0.704	4.578
LN X SERIES	8.954	0.160	0.018	0.225	3.421
LN(X-A) SERIES	8.373	0.284	0.034	-0.062	3.055

X(MIN)= 5860.000
X(MAX)= 11430.000
LOWER OUTLIER LIMIT OF X= 5212.197

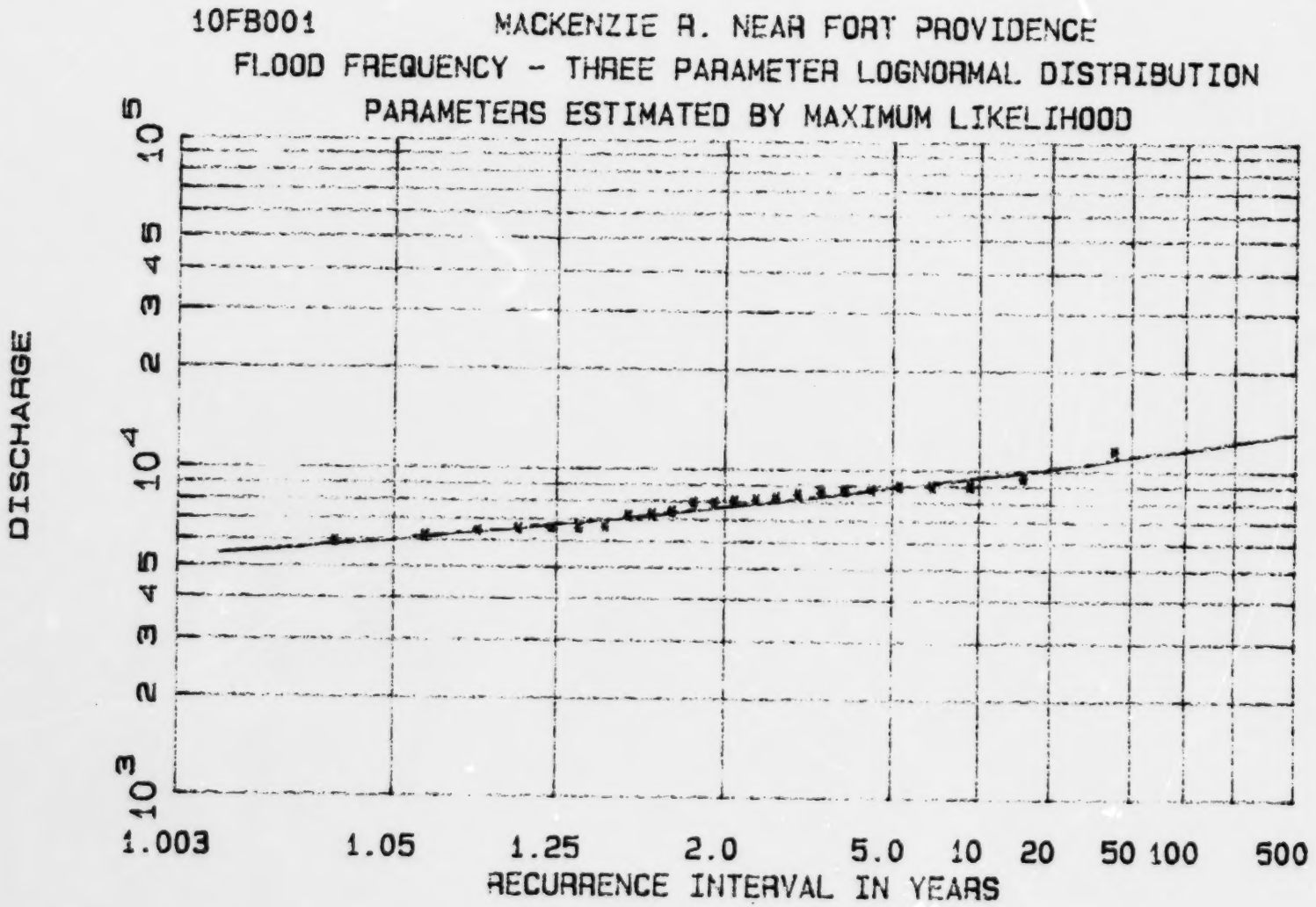
TOTAL SAMPLE SIZE= 24
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 3334.464 M= 8.373 S= 0.284

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	5320.00
1.050	0.952	6030.00
1.250	0.800	6740.00
2.000	0.500	7670.00
5.000	0.200	8840.00
10.000	0.100	9570.00
20.000	0.050	10200.00
50.000	0.020	11100.00
100.000	0.010	11700.00
200.000	0.005	12300.00
500.000	0.002	13200.00


10FB001 MACKENZIE R. NEAR FORT PROVIDENCE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3 2 3 4 5 10^4 2 3 4 5 10^5
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10GC003
WSC STATION NAME=MARTIN RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1973	68.500	283.000*	1	4.55	22.000
5	1974	79.900	124.000	2	12.12	8.250
5	1975	101.000	115.000	3	19.70	5.077
5	1976	113.000	113.000	4	27.27	3.667
5	1977	102.000	102.000	5	34.85	2.870
5	1978	64.800	101.000	6	42.42	2.357
5	1979	115.000	98.400	7	50.00	2.000
5	1980	19.100	93.100	8	57.58	1.737
5	1981	98.400	79.900	9	65.15	1.535
5	1982	283.000	78.200	10	72.73	1.375
5	1983	124.000	68.500	11	80.30	1.245
7	1984	78.200	64.800	12	87.88	1.138
5	1985	93.100	19.100*	13	95.45	1.048

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10GC003 MARTIN RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	103.077	60.585	0.588	2.267	11.280
LN X SERIES	4.491	0.590	0.131	-1.011	8.462

X(MIN)= 19.100
X(MAX)= 283.000
LOWER OUTLIER LIMIT OF X= 24.725

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

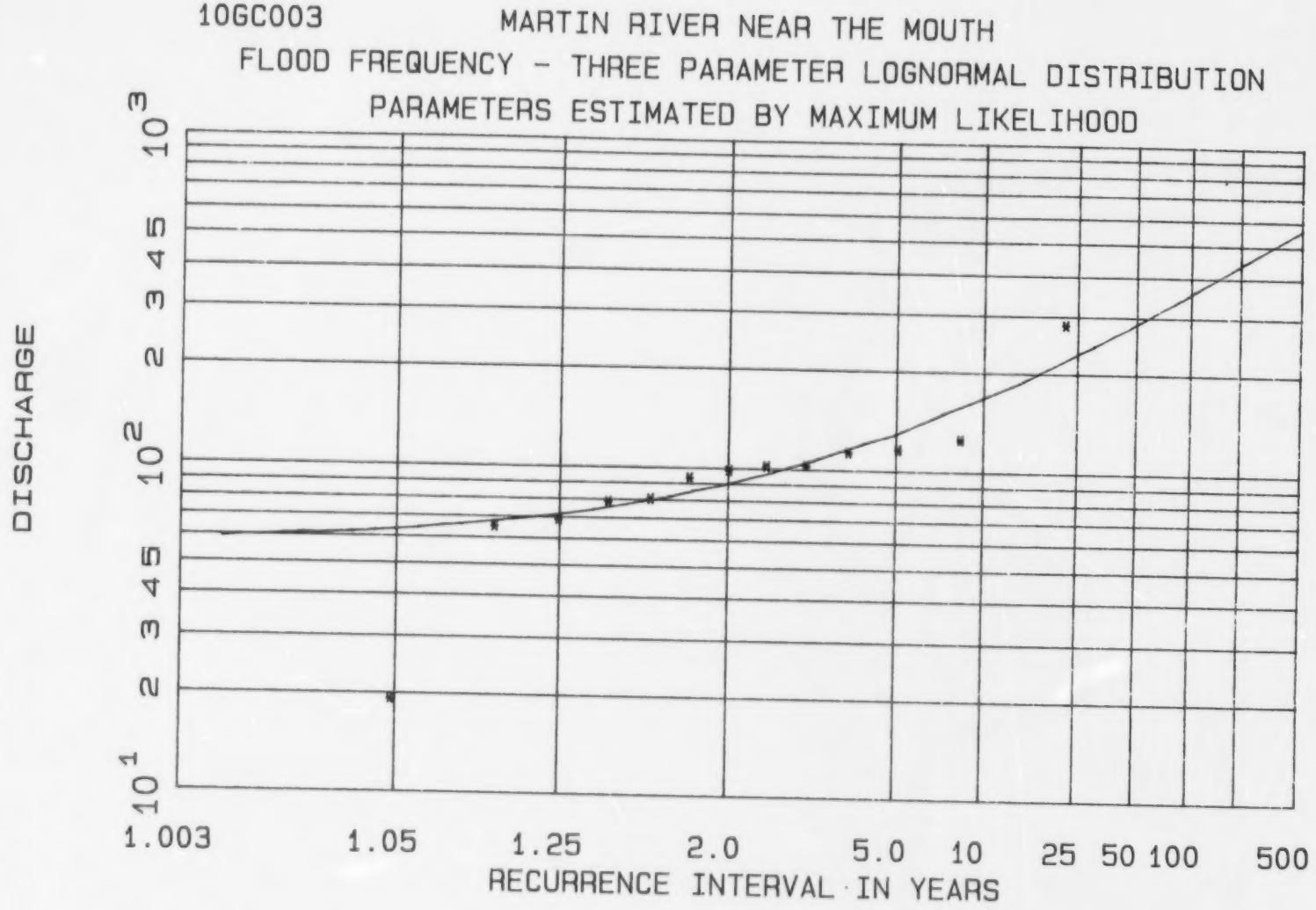
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	110.075	57.530	0.523	2.831	12.995
LN X SERIES	4.620	0.382	0.083	1.769	8.700
LN(X-A) SERIES	3.624	0.861	0.238	0.160	5.098

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= 56.558 M= 3.504 S= 0.947

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	59.00
1.050	0.952	63.40
1.250	0.800	71.50
2.000	0.500	89.80
5.000	0.200	130.00
10.000	0.100	168.00
20.000	0.050	214.00
50.000	0.020	289.00
100.000	0.010	358.00
200.000	0.005	438.00
500.000	0.002	564.00


10GC003
MARTIN RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10MC002
WSC STATION NAME=PEEL RIVER ABOVE FORT MCPHERSON

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1974	4300.000	10600.000	1	4.92	20.333
5	1975	10600.000	9930.000	2	13.11	7.625
5	1976	4640.000	8380.000	3	21.31	4.692
5	1977	8380.000	8200.000	4	29.51	3.389
6	1978	7790.000	8000.000	5	37.70	2.652
5	1979	5220.000	7790.000	6	45.90	2.179
5	1980	8200.000	7113.000	7	54.10	1.848
99	1981	7113.000	7000.000	8	62.30	1.605
5	1982	9930.000	6800.000	9	70.49	1.419
6	1983	8000.000	5220.000	10	78.69	1.271
5	1984	6800.000	4640.000	11	86.89	1.151
5	1985	7000.000	4300.000	12	95.08	1.052

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10MC002 PEEL RIVER ABOVE FORT MCPHERSON

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	7331.083	1937.167	0.264	-0.034	3.566
LN X SERIES	8.865	0.282	0.032	-0.552	3.591
LN(A-X) SERIES	11.540	0.019	0.002	-0.005	3.584

X(MIN)= 4300.000
X(MAX)= 10600.000
LOWER OUTLIER LIMIT OF X= 3882.415

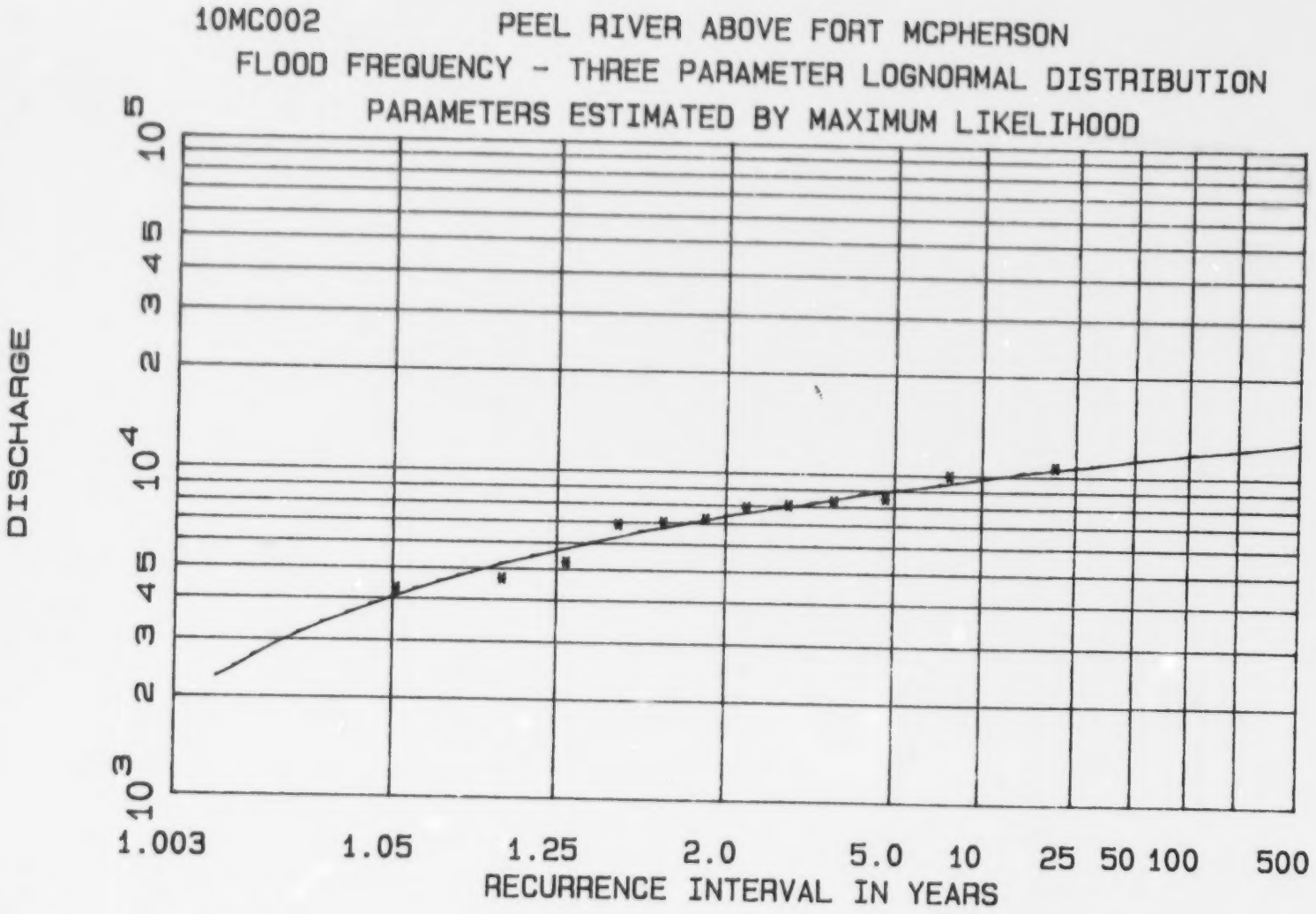
TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.1101E+06
3LN PARAMETERS: A=110083.555 M=11.540 S= 0.019

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	1880.00
1.050	0.952	4060.00
1.250	0.800	5710.00
2.000	0.500	7350.00
5.000	0.200	8960.00
10.000	0.100	9800.00
20.000	0.050	10500.00
50.000	0.020	11300.00
100.000	0.010	11800.00
200.000	0.005	12200.00
500.000	0.002	12800.00


10MC002
PEEL RIVER ABOVE FORT MCPHERSON
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^5
2 3 4 5
10^4
2 3 4 5
10^3
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10EC002
WSC STATION NAME=PRAIRIE CREEK AT CADILLAC MINE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1975	47.500	61.900	1	5.36	18.667
7	1976	52.800	52.800	2	14.29	7.000
99	1977	42.500	51.900	3	23.21	4.308
7	1978	27.000	47.500	4	32.14	3.111
7	1979	61.900	45.800	5	41.07	2.435
8	1980	22.400	42.500	6	50.00	2.000
6	1981	40.000	40.000	7	58.93	1.697
6	1982	35.100	35.100	8	67.86	1.474
5	1983	45.800	30.900	9	76.79	1.302
6	1984	51.900	27.000	10	85.71	1.167
7	1985	30.900	22.400	11	94.64	1.057

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10EC002 PRAIRIE CREEK AT CADILLAC MINE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	41.618	11.992	0.288	-0.045	3.499
LN X SERIES	3.687	0.310	0.084	-0.574	3.743
LN(A-X) SERIES	6.014	0.029	0.005	-0.010	3.527

X(MIN)= 22.400
X(MAX)= 61.900
LOWER OUTLIER LIMIT OF X= 20.899

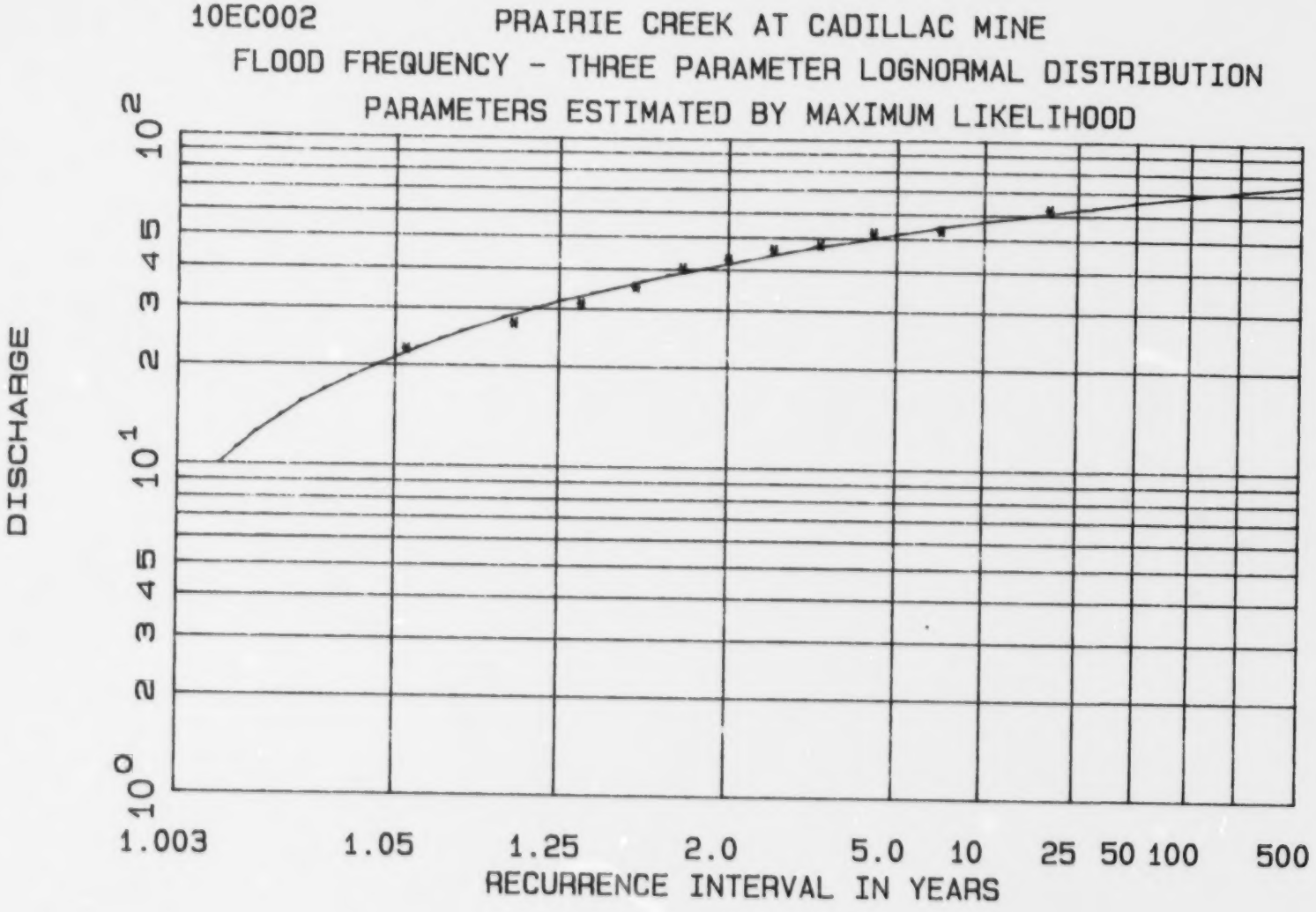
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.4507E+03
3LN PARAMETERS: A= 450.730 M= 6.014 S= 0.029

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	7.46
1.050	0.952	21.30
1.250	0.800	31.60
2.000	0.500	41.80
5.000	0.200	51.70
10.000	0.100	56.90
20.000	0.050	61.00
50.000	0.020	65.70
100.000	0.010	68.70
200.000	0.005	71.50
500.000	0.002	74.90


10EC002
PRAIRIE CREEK AT CADILLAC MINE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^0 2 3 4 5 10^1 2 3 4 5 10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=06MA002
WSC STATION NAME=QINGUQ CREEK NEAR BAKER LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1970	30.000	90.300	1	3.70	27.000
6	1971	39.900	83.300	2	9.88	10.125
6	1972	55.200	55.200	3	16.05	6.231
5	1973	51.000	54.200	4	22.22	4.500
5	1974	28.300	53.500	5	28.40	3.522
6	1975	90.300	51.000	6	34.57	2.893
6	1976	83.300	47.600	7	40.74	2.455
6	1977	20.800	39.900	8	46.91	2.132
6	1978	53.500	39.700	9	53.09	1.884
99	1979	30.700	39.500	10	59.26	1.688
99	1980	21.600	30.700	11	65.43	1.528
6	1981	39.500	30.000	12	71.60	1.397
6	1982	28.500	28.500	13	77.78	1.286
99	1983	39.700	28.300	14	83.95	1.191
99	1984	54.200	21.600	15	90.12	1.110
6	1985	47.600	20.800	16	96.30	1.038

NOTE A "99" IN COLUMN #1 INDICATES
THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06MA002 QINGUQ CREEK NEAR BAKER LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	44.631	20.031	0.449	1.096	4.606
LN X SERIES	3.711	0.429	0.116	0.215	3.238
LN(X-A) SERIES	3.315	0.628	0.190	-0.175	3.238

X(MIN)= 20.800
X(MAX)= 90.300
LOWER OUTLIER LIMIT OF X= 15.394

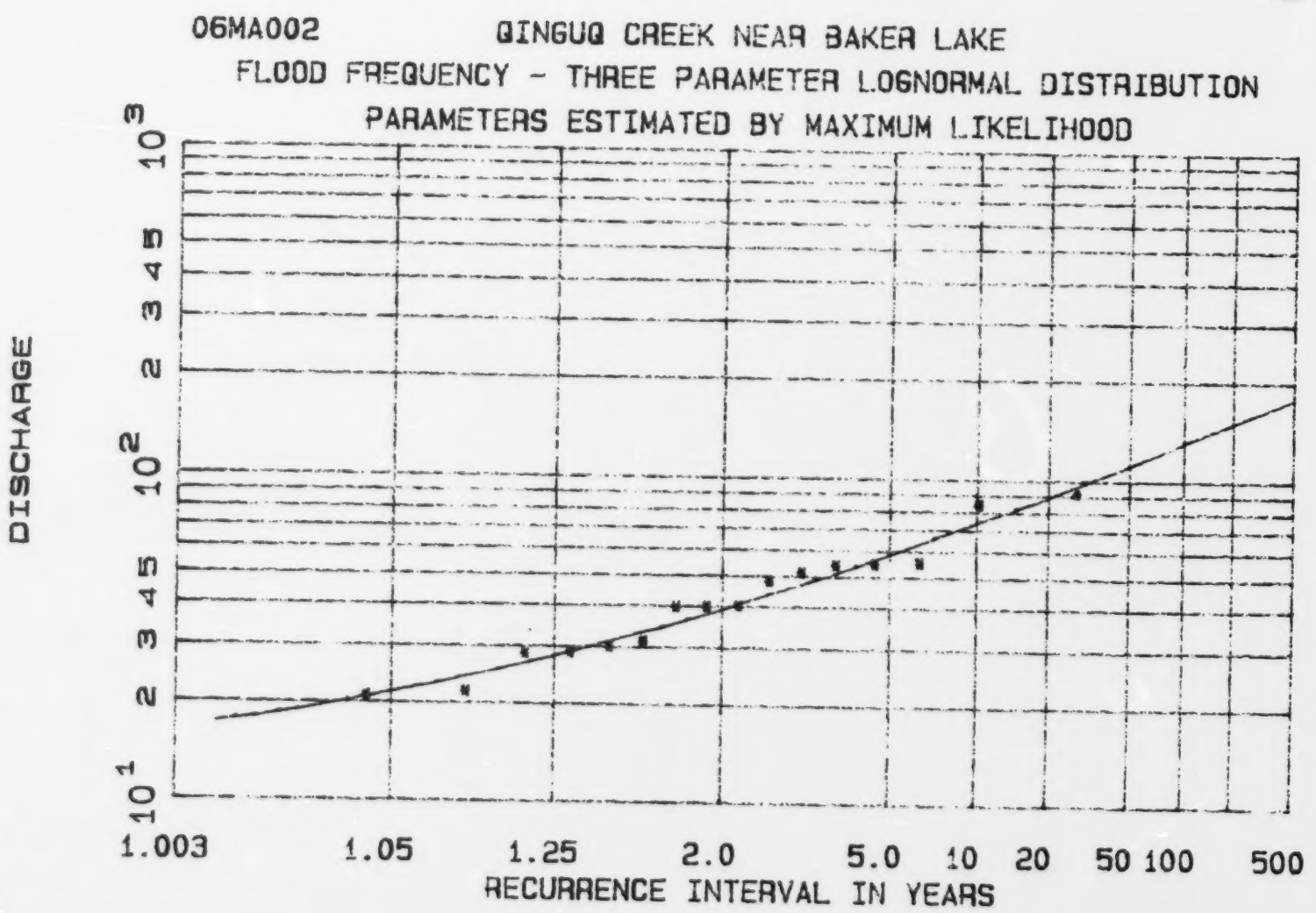
TOTAL SAMPLE SIZE= 16
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 11.826 M= 3.315 S= 0.628

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	16.70
1.050	0.952	21.50
1.250	0.800	28.00
2.000	0.500	39.30
5.000	0.200	58.50
10.000	0.100	73.40
20.000	0.050	89.20
50.000	0.020	112.00
100.000	0.010	131.00
200.000	0.005	151.00
500.000	0.002	180.00


06MA002
QINGUQ CREEK NEAR BAKER LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
2
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=06MB001
WSC STATION NAME=QUOICH RIVER ABOVE ST CLAIR FALLS

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1972	1270.000	3180.000	1	4.23	23.667
9	1973	595.000	2690.000	2	11.27	8.875
6	1974	1130.000	2550.000	3	18.31	5.462
6	1975	1180.000	1900.000	4	25.35	3.944
6	1976	1480.000	1670.000	5	32.39	3.087
6	1977	1900.000	1480.000	6	39.44	2.536
7	1978	1670.000	1322.000	7	46.48	2.152
6	1979	1030.000	1296.000	8	53.52	1.868
99	1980	1322.000	1280.000	9	60.56	1.651
99	1981	1280.000	1270.000	10	67.61	1.479
6	1982	3180.000	1180.000	11	74.65	1.340
99	1983	1296.000	1130.000	12	81.69	1.224
6	1984	2690.000	1030.000	13	88.73	1.127
6	1985	2550.000	595.000	14	95.77	1.044

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06MB001 QUOICH RIVER ABOVE ST CLAIR FALLS

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1612.357	723.633	0.449	1.036	4.234
LN X SERIES	7.297	0.436	0.060	0.014	4.311
LN(X-A) SERIES	7.292	0.439	0.060	0.006	4.323

X(MIN)= 595.000
X(MAX)= 3180.000
LOWER OUTLIER LIMIT OF X= 562.211

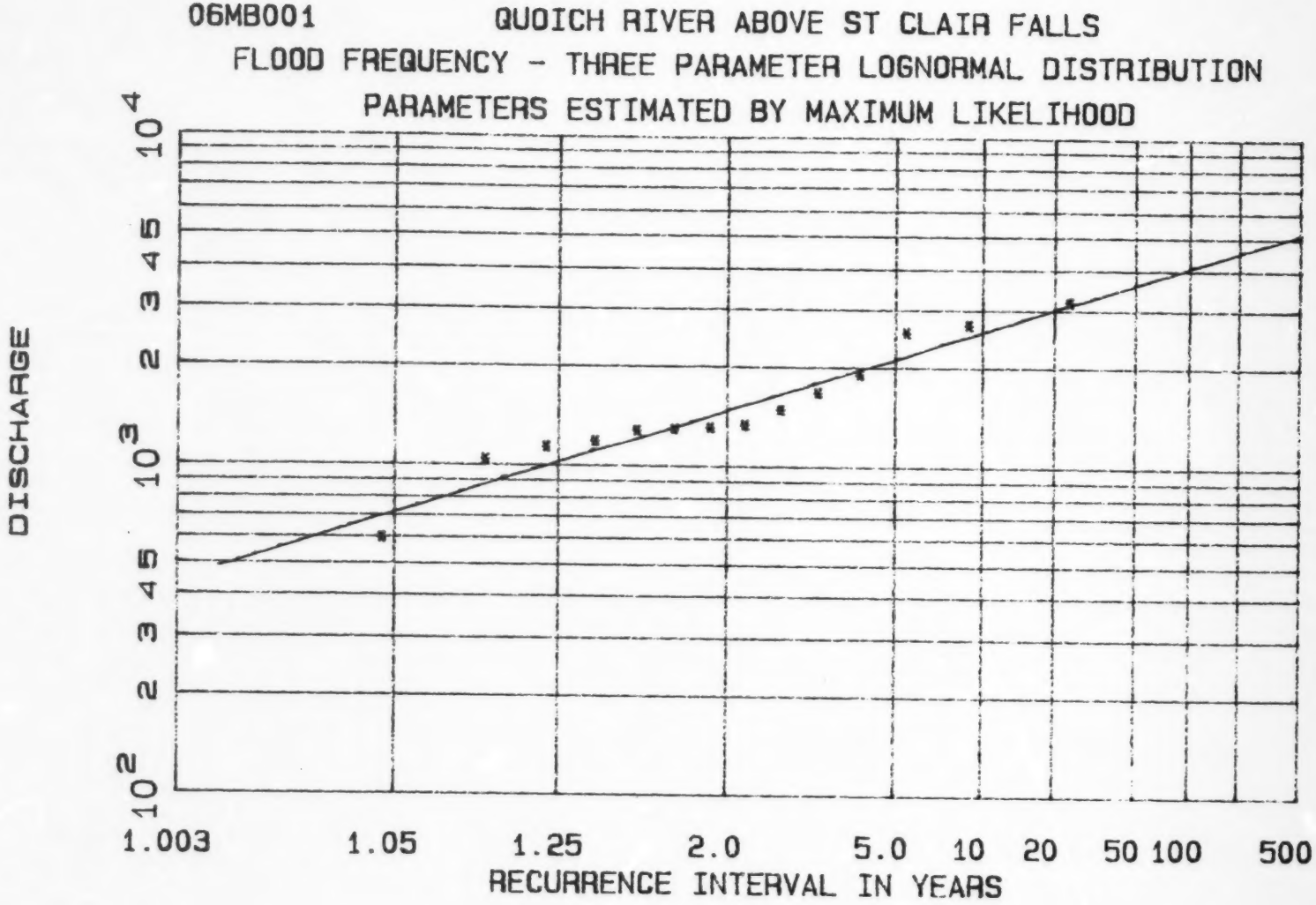
TOTAL SAMPLE SIZE= 14
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 7.607 M= 7.292 S= 0.439

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	447.00
1.050	0.952	713.00
1.250	0.800	1020.00
2.000	0.500	1480.00
5.000	0.200	2130.00
10.000	0.100	2580.00
20.000	0.050	3030.00
50.000	0.020	3620.00
100.000	0.010	4080.00
200.000	0.005	4550.00
500.000	0.002	5200.00


06MB001 QUOICH RIVER ABOVE ST CLAIR FALLS
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^2 2 3 4 5 10^3 2 3 4 5 10^4
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10LC003
WSC STATION NAME=RENGLENG RIVER BELOW DEMPSTER HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
8	1976	34.000	205.000*	1	5.88	17.000
99	1977	91.300	91.300	2	15.69	6.375
6	1978	50.100	59.300	3	25.49	3.923
5	1979	21.900	50.100	4	35.29	2.833
5	1980	205.000	39.500	5	45.10	2.217
5	1981	21.000	34.000	6	54.90	1.821
5	1982	59.300	30.000	7	64.71	1.545
6	1983	27.500	27.500	8	74.51	1.342
5	1984	39.500	21.900	9	84.31	1.186
5	1985	30.000	21.000	10	94.12	1.062

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10LC003 RENGLENG RIVER BELOW DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	57.960	55.864	0.964	2.428	10.626
LN X SERIES	3.788	0.706	0.186	1.217	5.674
LN(X-A) SERIES	4.241	0.512	0.121	1.572	6.836

X(MIN)= 21.000
X(MAX)= 205.000
LOWER OUTLIER LIMIT OF X= 10.487

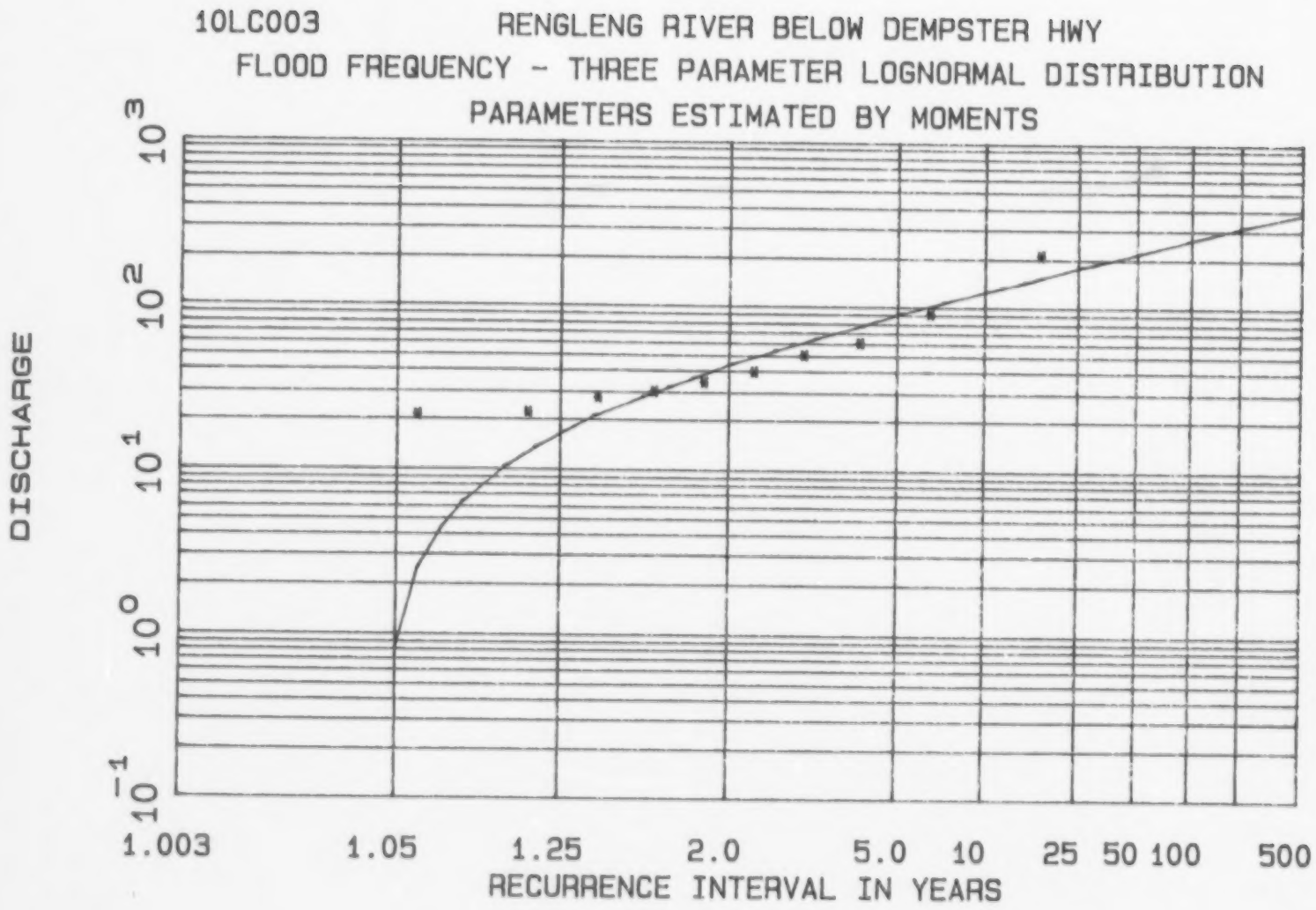
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

3LN PARAMETERS: A= -22.220 M= 4.186 S= 0.629

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	0.81
1.250	0.800	16.50
2.000	0.500	43.60
5.000	0.200	89.50
10.000	0.100	125.00
20.000	0.050	163.00
50.000	0.020	217.00
100.000	0.010	262.00
200.000	0.005	310.00
500.000	0.002	380.00


10LC003 RENGLENG RIVER BELOW DEMPSTER HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10LC003 RENGLENG RIVER BELOW DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	57.960	55.864	0.964	2.428	10.626
LN X SERIES	3.788	0.706	0.186	1.217	5.674

X(MIN)= 21.000
X(MAX)= 205.000
LOWER OUTLIER LIMIT OF X= 10.487

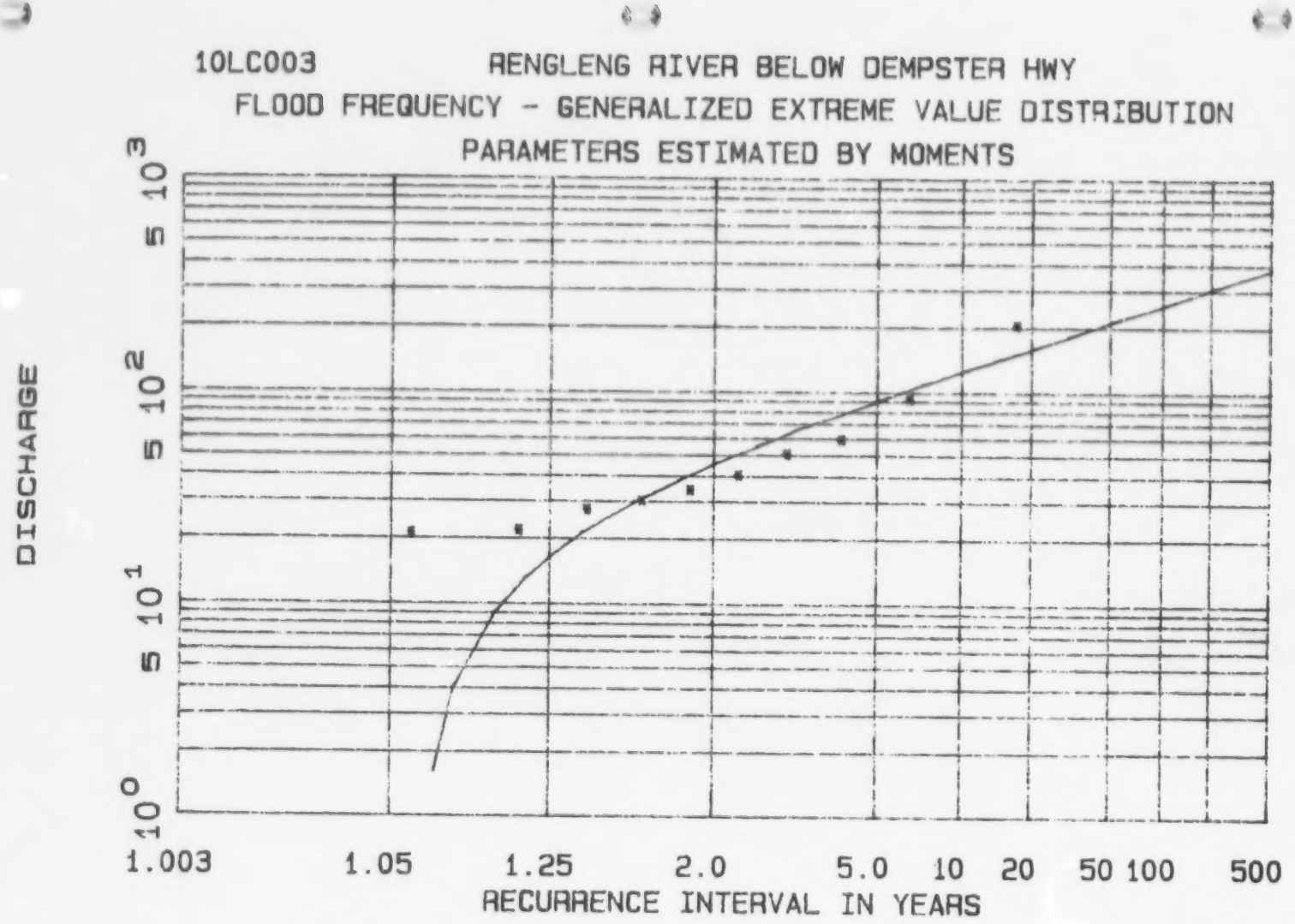
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

GEV PARAMETERS: U= 32.37 A= 34.557 K= -0.143

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	-
1.250	0.800	16.50
2.000	0.500	45.40
5.000	0.200	90.20
10.000	0.100	124.00
20.000	0.050	160.00
50.000	0.020	213.00
100.000	0.010	257.00
200.000	0.005	306.00
500.000	0.002	378.00


10LC003 RENGLENG RIVER BELOW DEMPSTER HWY
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10LC003 RENGLENG RIVER BELOW DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	57.960	55.864	0.964	2.428	10.626
LN X SERIES	3.788	0.706	0.186	1.217	5.674

X(MIN)= 21.000
X(MAX)= 205.000
LOWER OUTLIER LIMIT OF X= 10.487

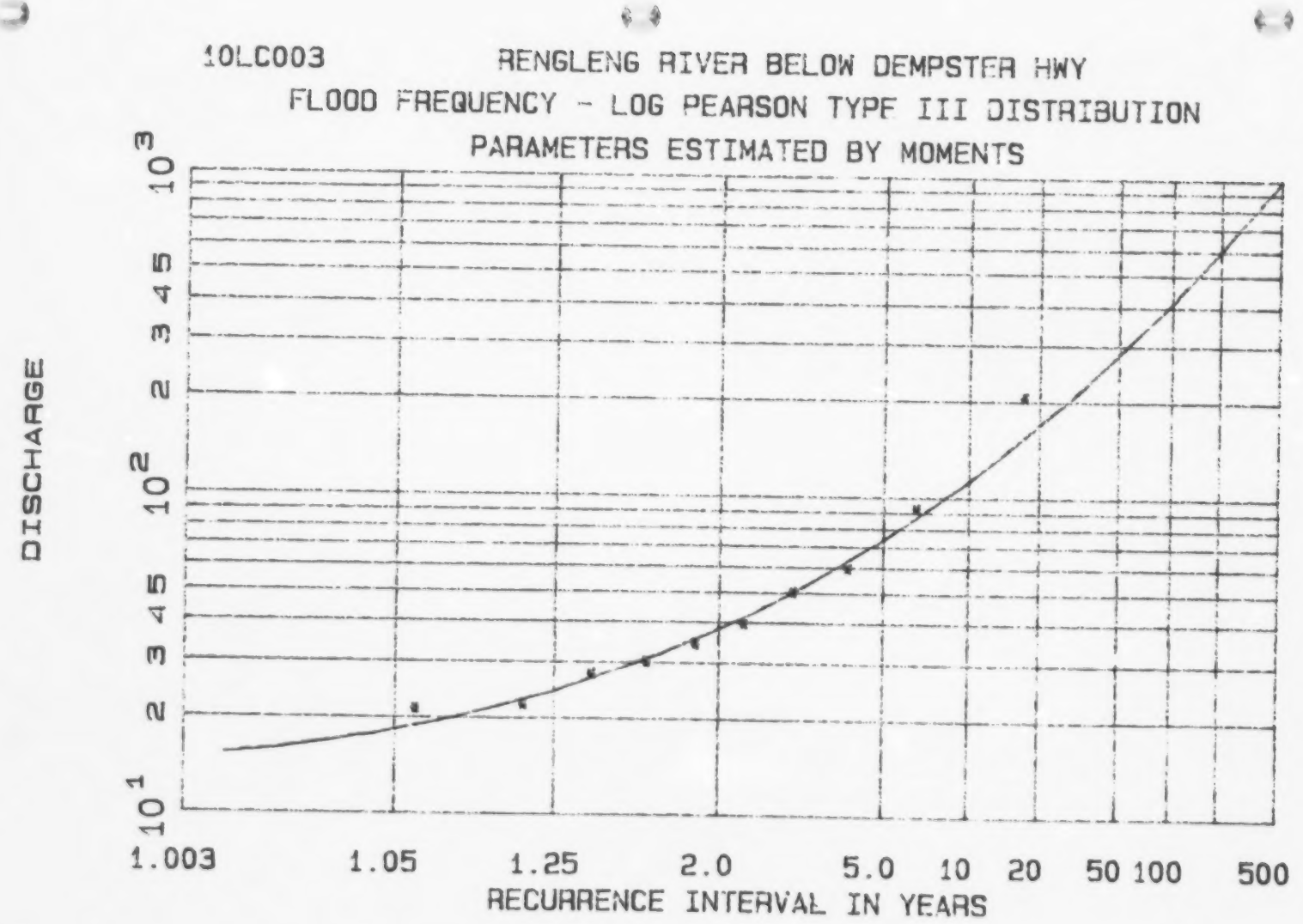
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

LP3 PARAMETERS: A= 0.4296 B= 2.701 LOG(M)= 2.628
M = 13.85

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	14.90
1.050	0.952	18.30
1.250	0.800	24.40
2.000	0.500	38.50
5.000	0.200	73.70
10.000	0.100	113.00
20.000	0.050	170.00
50.000	0.020	284.00
100.000	0.010	414.00
200.000	0.005	602.00
500.000	0.002	981.00


10LC003
RENGLENG RIVER BELOW DEMPSTER HWY
FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10LC003 RENGLENG RIVER BELOW DEMPSTER HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	57.960	55.864	0.964	2.428	10.626
LN X SERIES	3.788	0.706	0.186	1.217	5.674

X(MIN)= 21.000
X(MAX)= 205.000
LOWER OUTLIER LIMIT OF X= 10.487

TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B, ASSUMING M TO BE NON-ZERO.

M= 17.984 A= -1.664 B= 10.24 C= 69.244 D= 0.375

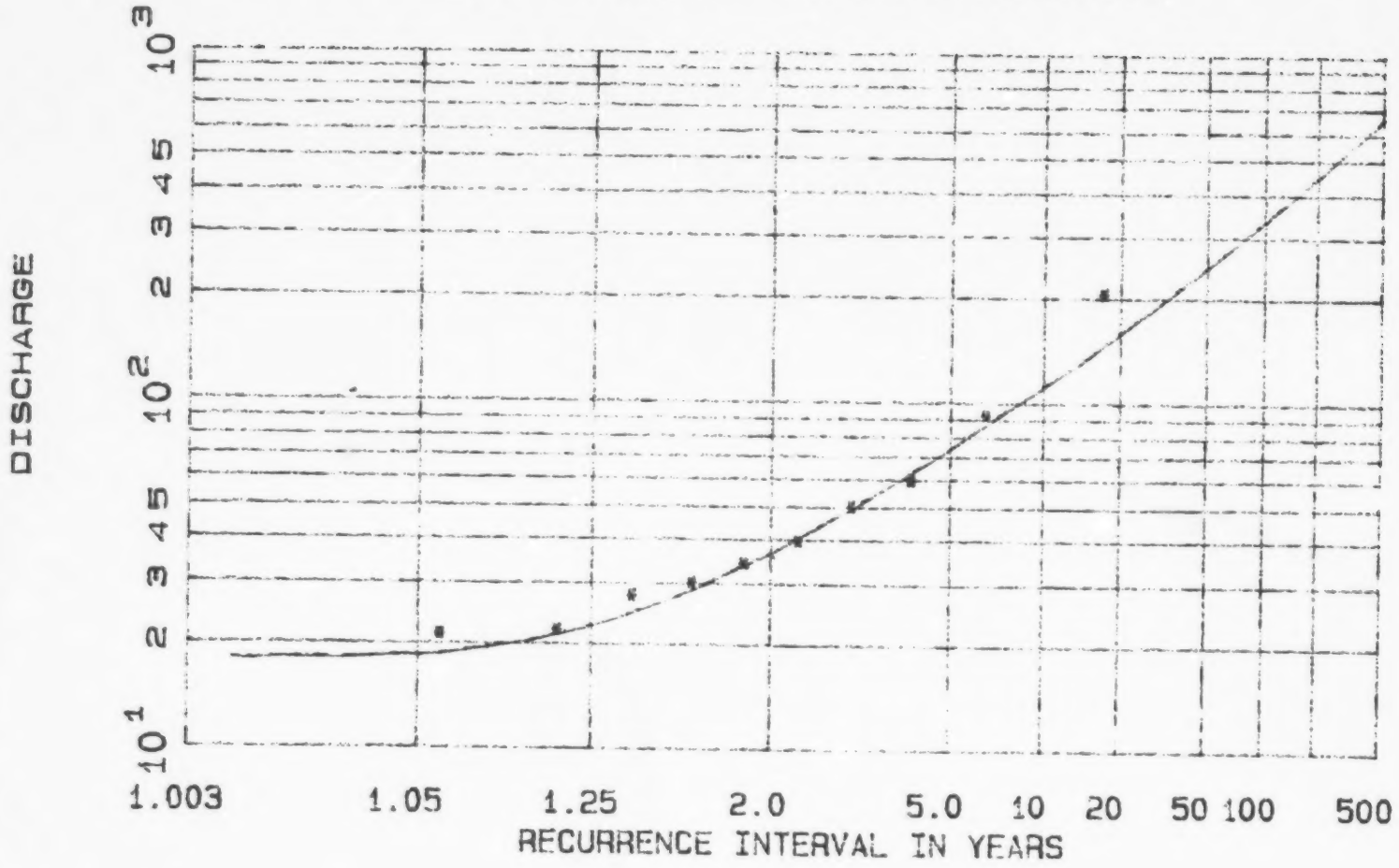
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	18.00
1.050	0.952	18.60
1.250	0.800	22.50
2.000	0.500	36.90
5.000	0.200	73.60
10.000	0.100	111.00
20.000	0.050	160.00
50.000	0.020	247.00
100.000	0.010	336.00
200.000	0.005	451.00
500.000	0.002	658.00

10LC003

RENGLENG RIVER BELOW DEMPSTER HWY

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=10GA001
WSC STATION NAME=ROOT RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
8	1975	1090.000	2750.000	1	5.36	18.667
5	1976	2750.000	1970.000	2	14.29	7.000
6	1977	521.000	1590.000	3	23.21	4.308
7	1978	1220.000	1220.000	4	32.14	3.111
7	1979	994.000	1090.000	5	41.07	2.435
8	1980	641.000	994.000	6	50.00	2.000
7	1981	330.000	954.000	7	58.93	1.697
8	1982	1970.000	831.000	8	67.86	1.474
8	1983	831.000	641.000	9	76.79	1.302
6	1984	954.000	521.000	10	85.71	1.167
5	1985	1590.000	330.000	11	94.64	1.057

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10GA001 ROOT RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1171.909	701.488	0.599	1.216	5.615
LN X SERIES	6.907	0.603	0.087	-0.153	4.218
LN(X-A) SERIES	6.933	0.587	0.085	-0.115	4.190

X(MIN)= 330.000
X(MAX)= 2750.000
LOWER OUTLIER LIMIT OF X= 283.906

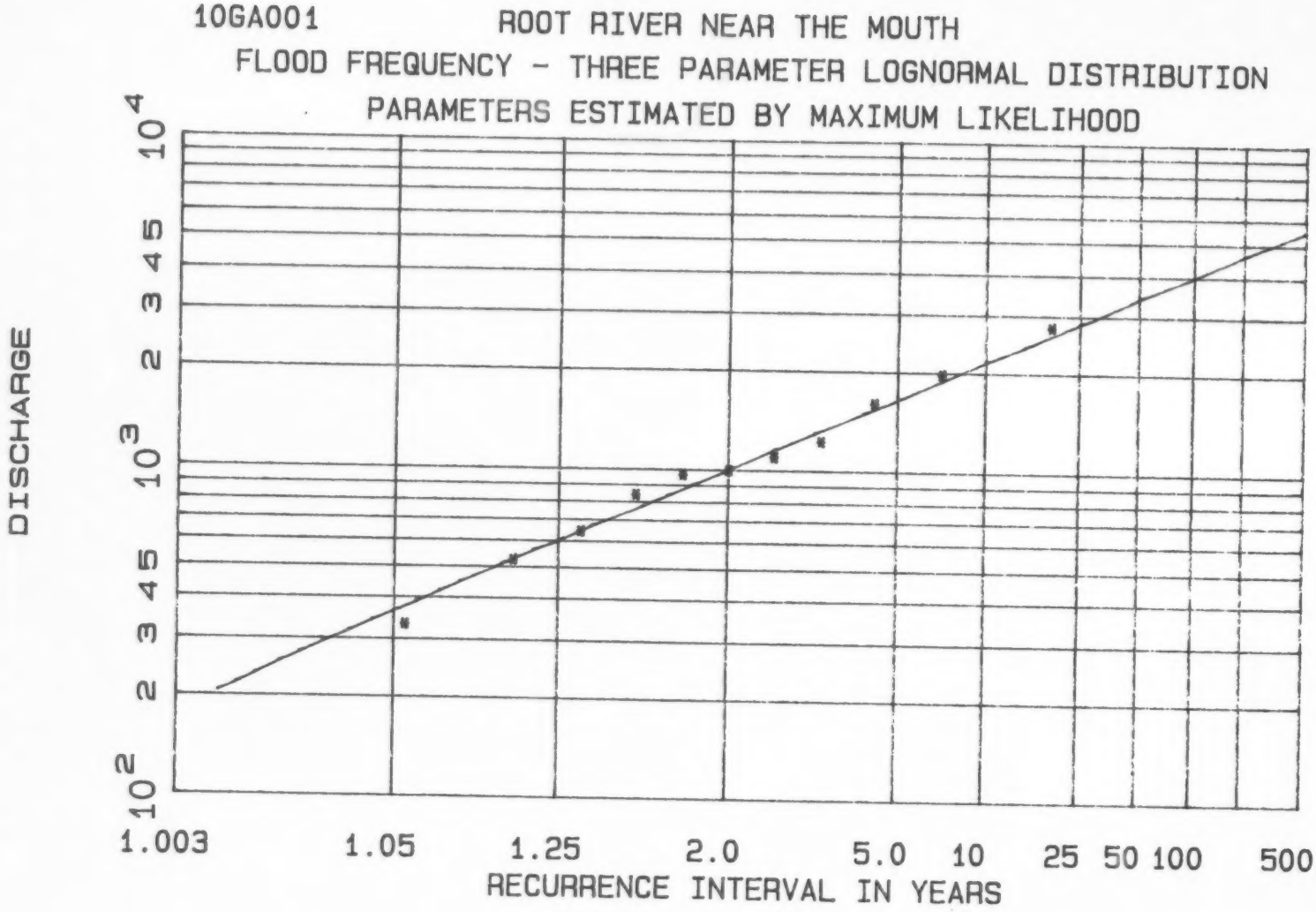
TOTAL SAMPLE SIZE= 11
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -22.175 M= 6.933 S= 0.587

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	182.00
1.050	0.952	363.00
1.250	0.800	603.00
2.000	0.500	1000.00
5.000	0.200	1660.00
10.000	0.100	2160.00
20.000	0.050	2670.00
50.000	0.020	3410.00
100.000	0.010	4000.00
200.000	0.005	4640.00
500.000	0.002	5540.00


10GA001
ROOT RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^2 2 3 4 5 10^3 2 3 4 5 10^4
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07QB002
WSC STATION NAME=SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
5	1976	118.000	285.000	1	5.88	17.000
5	1977	226.000	251.000	2	15.69	6.375
6	1978	204.000	226.000	3	25.49	3.923
5	1979	285.000	218.000	4	35.29	2.833
5	1980	95.100	204.000	5	45.10	2.217
5	1981	203.000	203.000	6	54.90	1.821
6	1982	192.000	192.000	7	64.71	1.545
6	1983	218.000	149.000	8	74.51	1.342
5	1984	149.000	118.000	9	84.31	1.186
5	1985	251.000	95.100	10	94.12	1.062

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07QB002 SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	194.110	58.592	0.302	-0.359	3.961
LN X SERIES	5.220	0.343	0.066	-0.936	4.498
LN(A-X) SERIES	5.708	0.192	0.034	-0.046	4.135

X(MIN)= 95.100
X(MAX)= 285.000
LOWER OUTLIER LIMIT OF X= 91.987

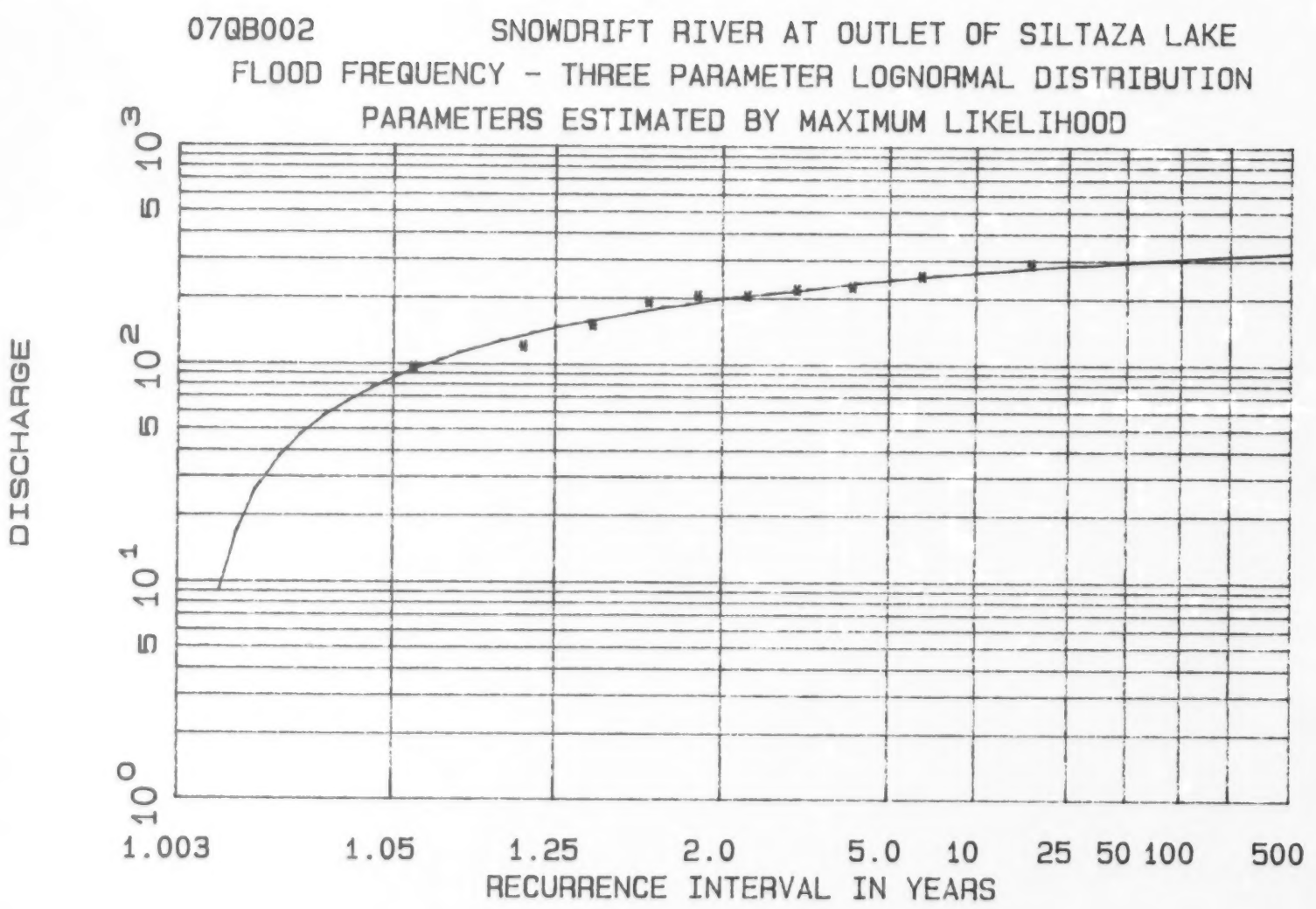
TOTAL SAMPLE SIZE= 10
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

DISTRIBUTION IS UPPER BOUNDED AT A= 0.5003E+03
3LN PARAMETERS: A= 500.308 M= 5.708 S= 0.192

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	-
1.050	0.952	85.50
1.250	0.800	146.00
2.000	0.500	199.00
5.000	0.200	244.00
10.000	0.100	265.00
20.000	0.050	281.00
50.000	0.020	297.00
100.000	0.010	308.00
200.000	0.005	317.00
500.000	0.002	327.00


07QB002 SNOWDRIFT RIVER AT OUTLET OF SILTAZA LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^3
5 10^2
5 10^1
10^0
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10EC001
WSC STATION NAME=SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1960	2380.000	6370.000*	1	2.29	43.667
99	1961	3212.000	3540.000	2	6.11	16.375
6	1962	6370.000	3212.000	3	9.92	10.077
6	1963	3540.000	2920.000	4	13.74	7.278
6	1964	2710.000	2800.000	5	17.56	5.696
7	1965	1840.000	2710.000	6	21.37	4.679
6	1966	1910.000	2680.000	7	25.19	3.970
99	1967	2397.000	2678.000	8	29.01	3.447
6	1968	2680.000	2570.000	9	32.82	3.047
7	1969	1560.000	2397.000	10	36.64	2.729
8	1970	1850.000	2380.000	11	40.46	2.472
6	1971	1570.000	2380.000	12	44.27	2.259
99	1972	2678.000	2260.000	13	48.09	2.079
6	1973	2380.000	2090.000	14	51.91	1.926
6	1974	2570.000	2040.000	15	55.73	1.795
6	1975	2800.000	1970.000	16	59.54	1.679
7	1976	2040.000	1930.000	17	63.36	1.578
6	1977	1870.000	1920.000	18	67.18	1.489
7	1978	2920.000	1910.000	19	70.99	1.409
6	1979	1920.000	1910.000	20	74.81	1.337
6	1980	1930.000	1870.000	21	78.63	1.272
6	1981	1760.000	1850.000	22	82.44	1.213
6	1982	1910.000	1840.000	23	86.26	1.159
6	1983	2260.000	1760.000	24	90.08	1.110
6	1984	1970.000	1570.000	25	93.89	1.065
6	1985	2090.000	1560.000	26	97.71	1.023

NOTE A "99" IN COLUMN #1 INDICATES
THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10EC001 SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	2427.577	948.151	0.391	3.075	15.456
LN X SERIES	7.745	0.297	0.038	1.629	7.657
LN(X-A) SERIES	6.660	0.749	0.112	0.052	4.151

X(MIN)= 1560.000
X(MAX)= 6370.000
LOWER OUTLIER LIMIT OF X= 1097.883

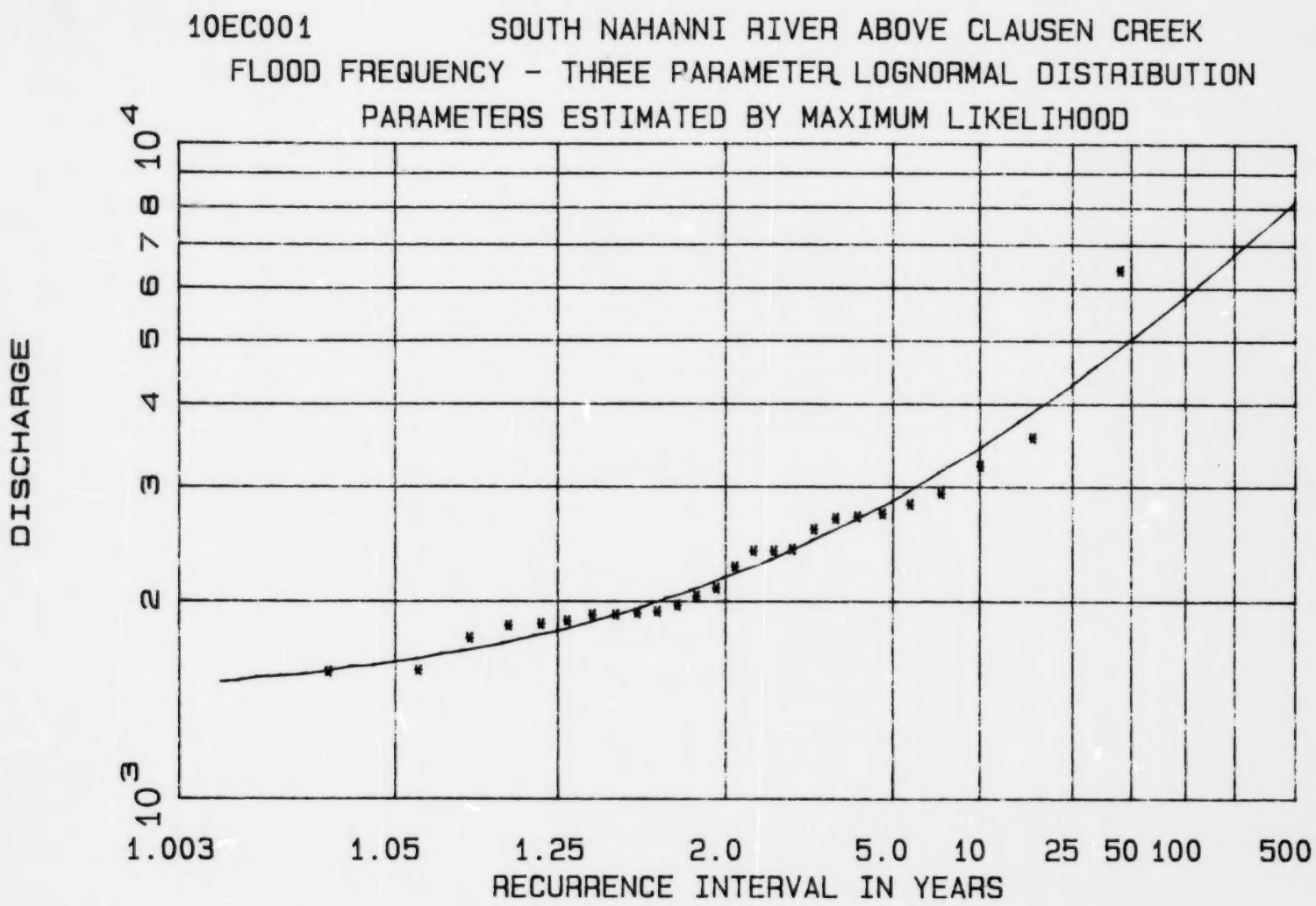
TOTAL SAMPLE SIZE= 26
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 1396.714 M= 6.660 S= 0.749

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	1500.00
1.050	0.952	1620.00
1.250	0.800	1810.00
2.000	0.500	2180.00
5.000	0.200	2860.00
10.000	0.100	3440.00
20.000	0.050	4070.00
50.000	0.020	5030.00
100.000	0.010	5860.00
200.000	0.005	6770.00
500.000	0.002	8140.00


10EC001 SOUTH NAHANNI RIVER ABOVE CLAUSEN CREEK
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
8
7
6
5
4
3
2
10^3
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10EB001
WSC STATION NAME=SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1961	2320.000	2320.000	1	2.38	42.000
6	1962	1700.000	1900.000	2	6.35	15.750
7	1963	1270.000	1850.000	3	10.32	9.692
6	1964	1670.000	1810.000	4	14.29	7.000
7	1965	900.000	1730.000	5	18.25	5.478
6	1966	1330.000	1700.000	6	22.22	4.500
6	1967	1420.000	1670.000	7	26.19	3.818
99	1968	1620.000	1630.000	8	30.16	3.316
7	1969	1120.000	1620.000	9	34.13	2.930
6	1970	1610.000	1610.000	10	38.10	2.625
6	1971	1310.000	1440.000	11	42.06	2.377
5	1972	1630.000	1420.000	12	46.03	2.172
5	1973	1420.000	1420.000	13	50.00	2.000
6	1974	991.000	1400.000	14	53.97	1.853
6	1975	1850.000	1390.000	15	57.94	1.726
7	1976	1360.000	1360.000	16	61.90	1.615
6	1977	1160.000	1330.000	17	65.87	1.518
7	1978	1730.000	1310.000	18	69.84	1.432
6	1979	1400.000	1270.000	19	73.81	1.355
6	1980	1200.000	1240.000	20	77.78	1.286
5	1981	1390.000	1200.000	21	81.75	1.223
6	1982	1810.000	1160.000	22	85.71	1.167
6	1983	1900.000	1120.000	23	89.68	1.115
6	1984	1240.000	991.000	24	93.65	1.068
7	1985	1440.000	900.000	25	97.62	1.024

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10EB001 SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	1471.640	316.805	0.215	0.580	4.206
LN X SERIES	7.272	0.215	0.030	-0.081	3.615
LN(X-A) SERIES	7.396	0.190	0.026	-0.006	3.608

X(MIN)= 900.000
X(MAX)= 2320.000
LOWER OUTLIER LIMIT OF X= 844.217

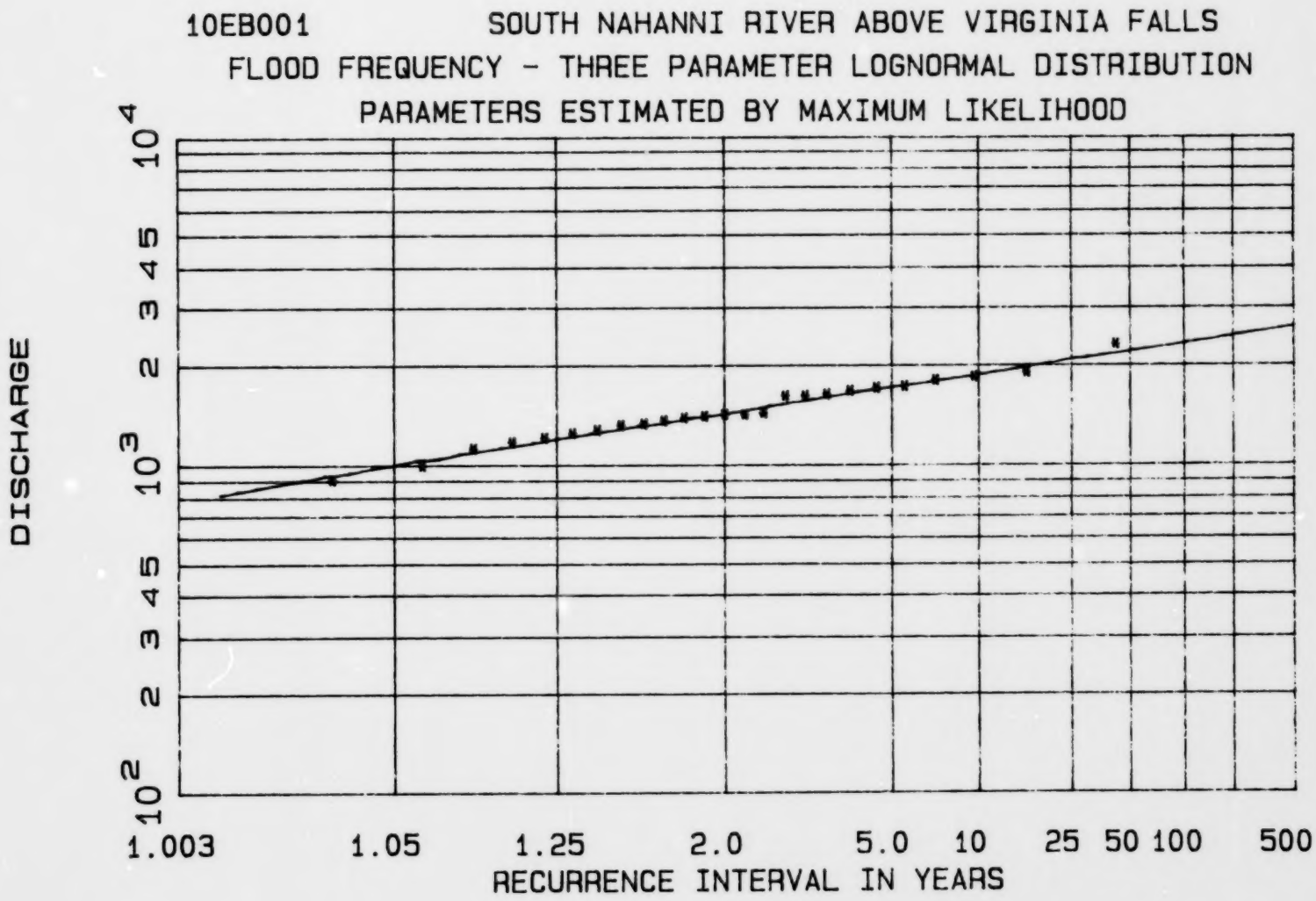
TOTAL SAMPLE SIZE= 25
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -185.748 M= 7.396 S= 0.190

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	781.00
1.050	0.952	1000.00
1.250	0.800	1200.00
2.000	0.500	1440.00
5.000	0.200	1730.00
10.000	0.100	1890.00
20.000	0.050	2040.00
50.000	0.020	2220.00
100.000	0.010	2350.00
200.000	0.005	2470.00
500.000	0.002	2630.00


10EB001 SOUTH NAHANNI RIVER ABOVE VIRGINIA FALLS
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07QA001
WSC STATION NAME=TALTSON RIVER AT OUTLET OF TSU LAKE

MONTH	YEAR	DATA (3) (CMS)	ORDERED (4) (CMS)	RANK (5)	PROB. (6) (%)	RET. PERIOD (7) (YEARS)
(1)	(2)					
7	1964	413.000	479.000	1	2.70	37.000
8	1965	362.000	431.000	2	7.21	13.875
10	1966	326.000	419.000	3	11.71	8.538
8	1967	340.000	413.000	4	16.22	6.167
99	1968	419.000	409.000	5	20.72	4.826
1	1969	264.000	368.000	6	25.23	3.964
12	1970	156.000	362.000	7	29.73	3.364
1	1971	154.000	340.000	8	34.23	2.921
7	1972	204.000	340.000	9	38.74	2.581
11	1973	218.000	326.000	10	43.24	2.313
11	1974	311.000	311.000	11	47.75	2.094
6	1975	479.000	271.000	12	52.25	1.914
6	1976	368.000	264.000	13	56.76	1.762
6	1977	198.000	228.000	14	61.26	1.632
6	1978	187.000	218.000	15	65.77	1.521
6	1979	165.000	204.000	16	70.27	1.423
6	1980	151.000	198.000	17	74.77	1.337
8	1981	228.000	187.000	18	79.28	1.261
7	1982	409.000	165.000	19	83.78	1.194
11	1983	271.000	156.000	20	88.29	1.133
11	1984	340.000	154.000	21	92.79	1.078
6	1985	431.000	151.000	22	97.30	1.028

NOTE A "99" IN COLUMN #1 INDICATES
THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07QA001 TALTSON RIVER AT OUTLET OF TSU LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	290.636	104.074	0.358	0.152	2.167
LN X SERIES	5.606	0.379	0.068	-0.223	2.104
LN(X-A) SERIES	5.846	0.298	0.051	-0.146	2.076

X(MIN)= 151.000
X(MAX)= 479.000
LOWER OUTLIER LIMIT OF X= 108.411

TOTAL SAMPLE SIZE= 22
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -69.872 M= 5.846 S= 0.298

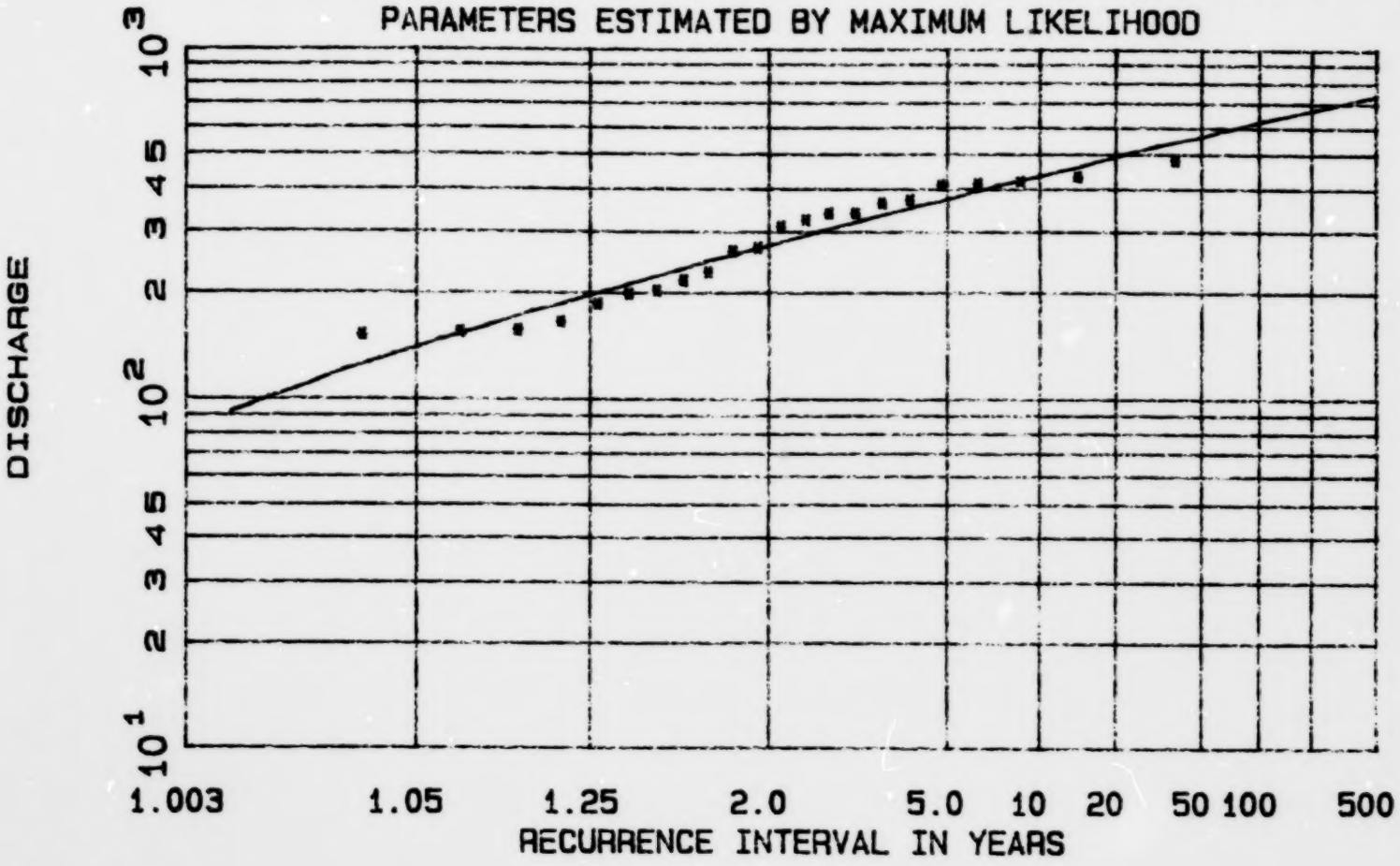
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	82.60
1.050	0.952	140.00
1.250	0.800	199.00
2.000	0.500	276.00
5.000	0.200	375.00
10.000	0.100	437.00
20.000	0.050	495.00
50.000	0.020	568.00
100.000	0.010	622.00
200.000	0.005	675.00
500.000	0.002	746.00

07QA001 TALTSON RIVER AT OUTLET OF TSU LAKE

FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



WSC STATION NO=06MA036C
WSC STATION NAME=THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1973	3060.000	6570.000*	1	4.55	22.000
6	1974	3230.000	3850.000	2	12.12	8.250
6	1975	2610.000	3510.000	3	19.70	5.077
6	1976	3200.000	3230.000	4	27.27	3.667
6	1977	2820.000	3200.000	5	34.85	2.870
7	1978	3510.000	3060.000	6	42.42	2.357
99	1979	3040.000	3040.000	7	50.00	2.000
99	1980	2017.000	2870.000	8	57.58	1.737
6	1981	2790.000	2825.000	9	65.15	1.535
6	1982	2870.000	2820.000	10	72.73	1.375
6	1983	3850.000	2790.000	11	80.30	1.245
6	1984	6570.000	2610.000	12	87.88	1.138
99	1985	2825.000	2017.000	13	95.45	1.048

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06MA036C THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	3260.923	1087.158	0.333	2.598	12.116
LN X SERIES	8.051	0.270	0.034	1.574	8.773
LN(X-A) SERIES	7.352	0.504	0.069	0.300	7.263

X(MIN)= 2017.000
X(MAX)= 6570.000
LOWER OUTLIER LIMIT OF X= 1743.866

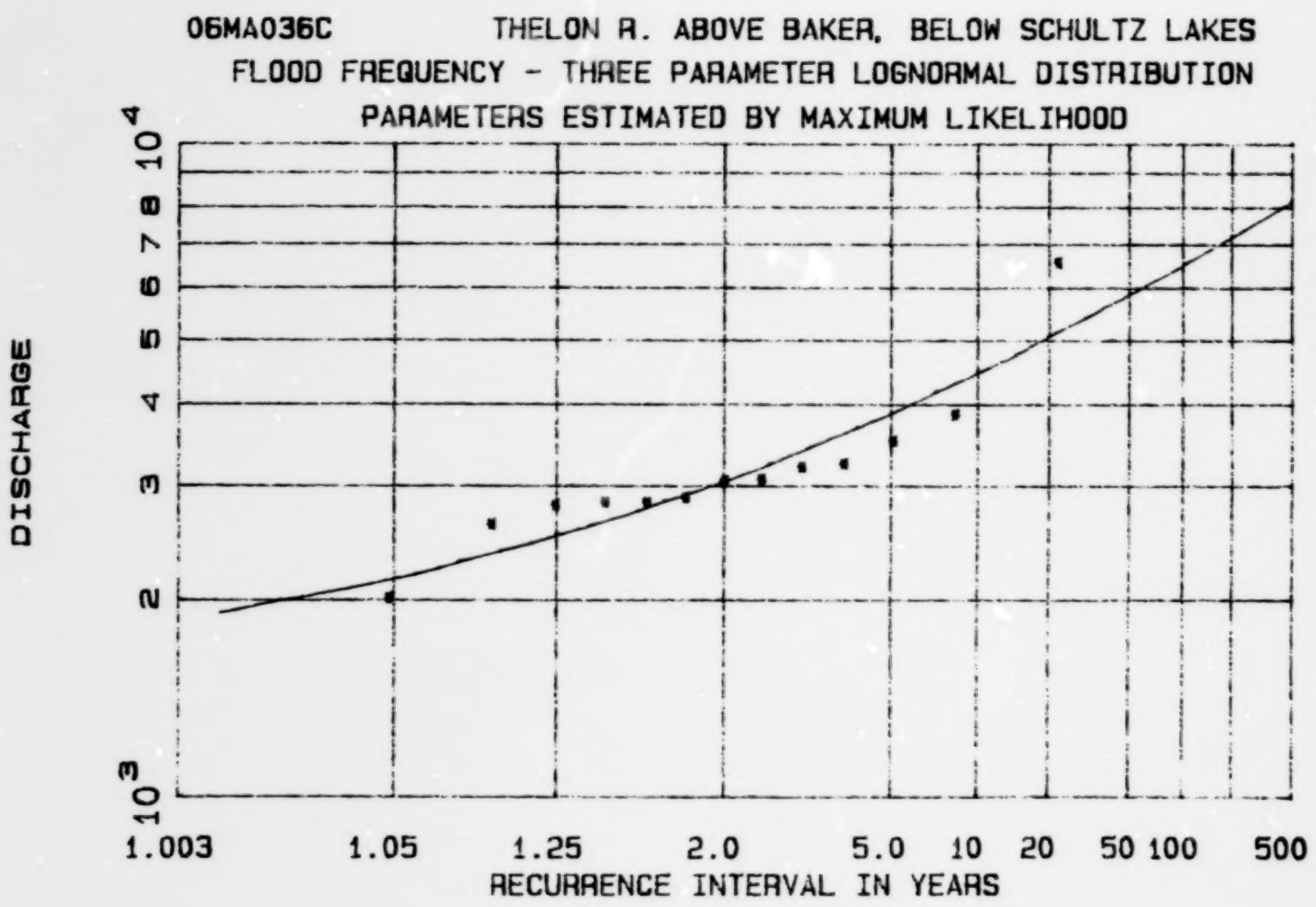
TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 1492.091 M= 7.352 S= 0.504

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	1880.00
1.050	0.952	2160.00
1.250	0.800	2510.00
2.000	0.500	3050.00
5.000	0.200	3880.00
10.000	0.100	4470.00
20.000	0.050	5070.00
50.000	0.020	5880.00
100.000	0.010	6530.00
200.000	0.005	7200.00
500.000	0.002	8140.00


06MA036C THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
8
7
6
5
4
3
2
10^3
1.003
1.05
1.25
2.0
5.0
10
20
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
06MA036C THELON R. ABOVE BAKER. BELOW SCHULTZ LAKES

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	3260.923	1087.158	0.333	2.598	12.116
LN X SERIES	8.051	0.270	0.034	1.574	8.773

X(MIN)= 2017.000
X(MAX)= 6570.000
LOWER OUTLIER LIMIT OF X= 1743.866

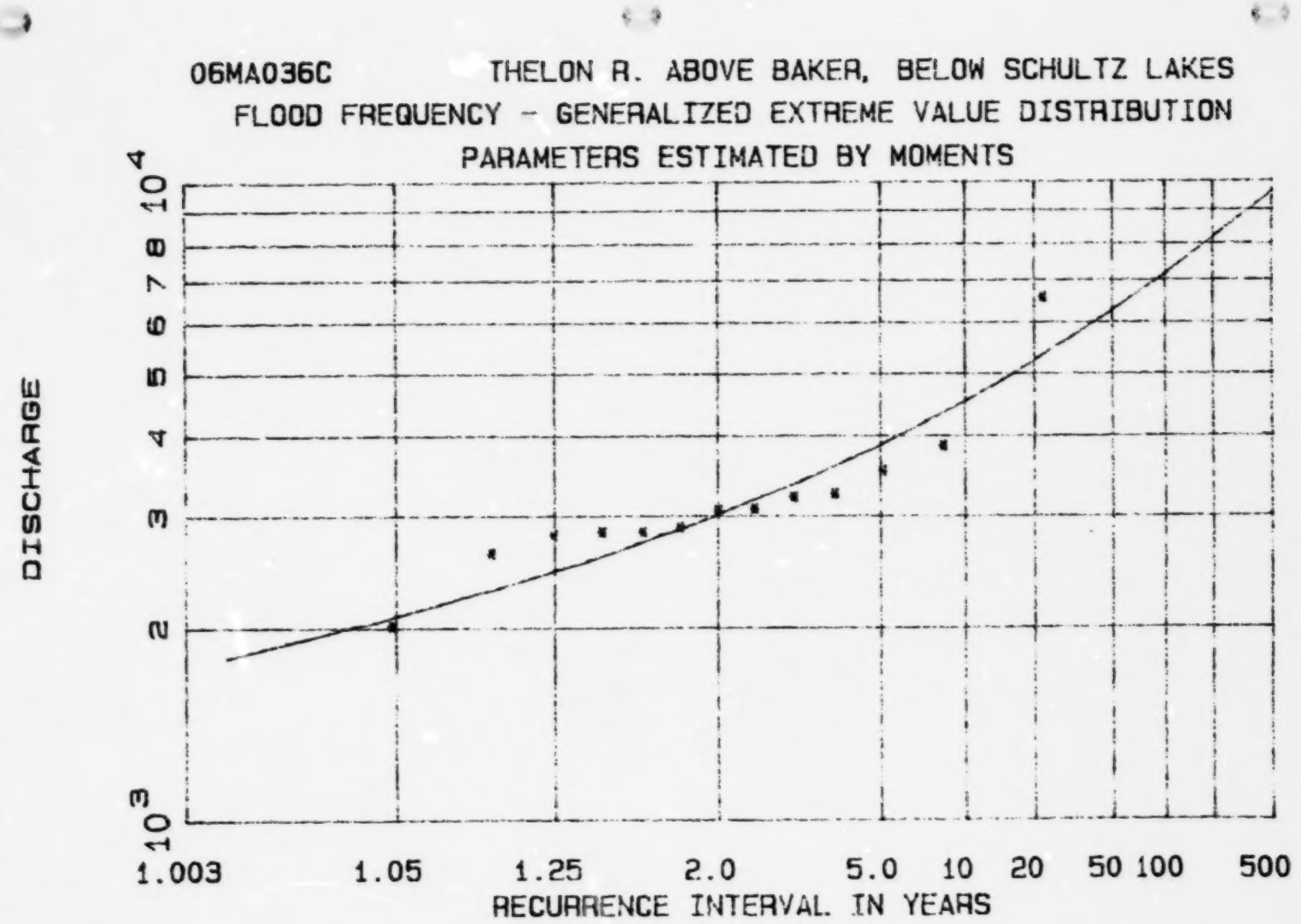
TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

GEV PARAMETERS: U= 2764.10 A= 657.373 K= -0.154

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	1750.00
1.050	0.952	2090.00
1.250	0.800	2460.00
2.000	0.500	3010.00
5.000	0.200	3870.00
10.000	0.100	4530.00
20.000	0.050	5240.00
50.000	0.020	6280.00
100.000	0.010	7170.00
200.000	0.005	8150.00
500.000	0.002	9620.00


06MA036C THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES
FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^3 2 3 4 5 6 7 8 10^4
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
06MA036C THELON R. ABOVE BAKER. BELOW SCHULTZ LAKES

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	3260.923	1087.158	0.333	2.598	12.116
LN X SERIES	8.051	0.270	0.034	1.574	8.773

X(MIN)= 2017.000
X(MAX)= 6570.000
LOWER OUTLIER LIMIT OF X= 1743.866

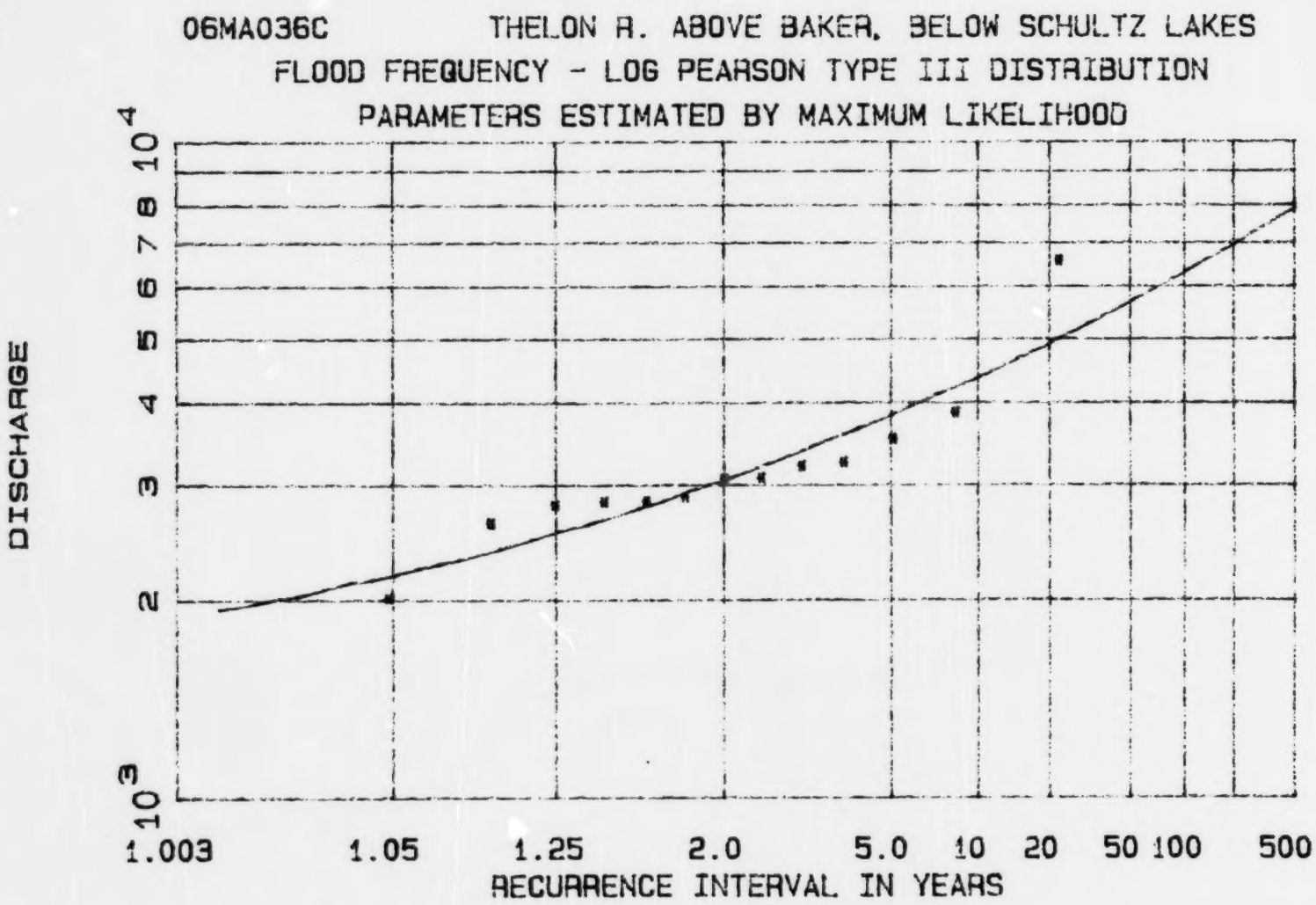
TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

LP3 PARAMETERS: A= 0.8418E-01 B= 8.720 LOG(M)= 7.317
M = 1506.

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	1890.00
1.050	0.952	2190.00
1.250	0.800	2540.00
2.000	0.500	3050.00
5.000	0.200	3820.00
10.000	0.100	4370.00
20.000	0.050	4930.00
50.000	0.020	5700.00
100.000	0.010	6320.00
200.000	0.005	6970.00
500.000	0.002	7910.00


06MA036C THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES
FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3 2 3 4 5 6 7 8 10^4
1.003 1.05 1.25 2.0 5.0 10 20 50 100 500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
06MA036C THELON R. ABOVE BAKER. BELOW SCHULTZ LAKES

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	3260.923	1087.158	0.333	2.598	12.116
LN X SERIES	8.051	0.270	0.034	1.574	8.773

X(MIN)= 2017.000
X(MAX)= 6570.000
LOWER OUTLIER LIMIT OF X= 1743.866

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED BY ASSUMING M TO BE ZERO. THE ITERATION ALGORITHM WAS NOT REQUIRED.

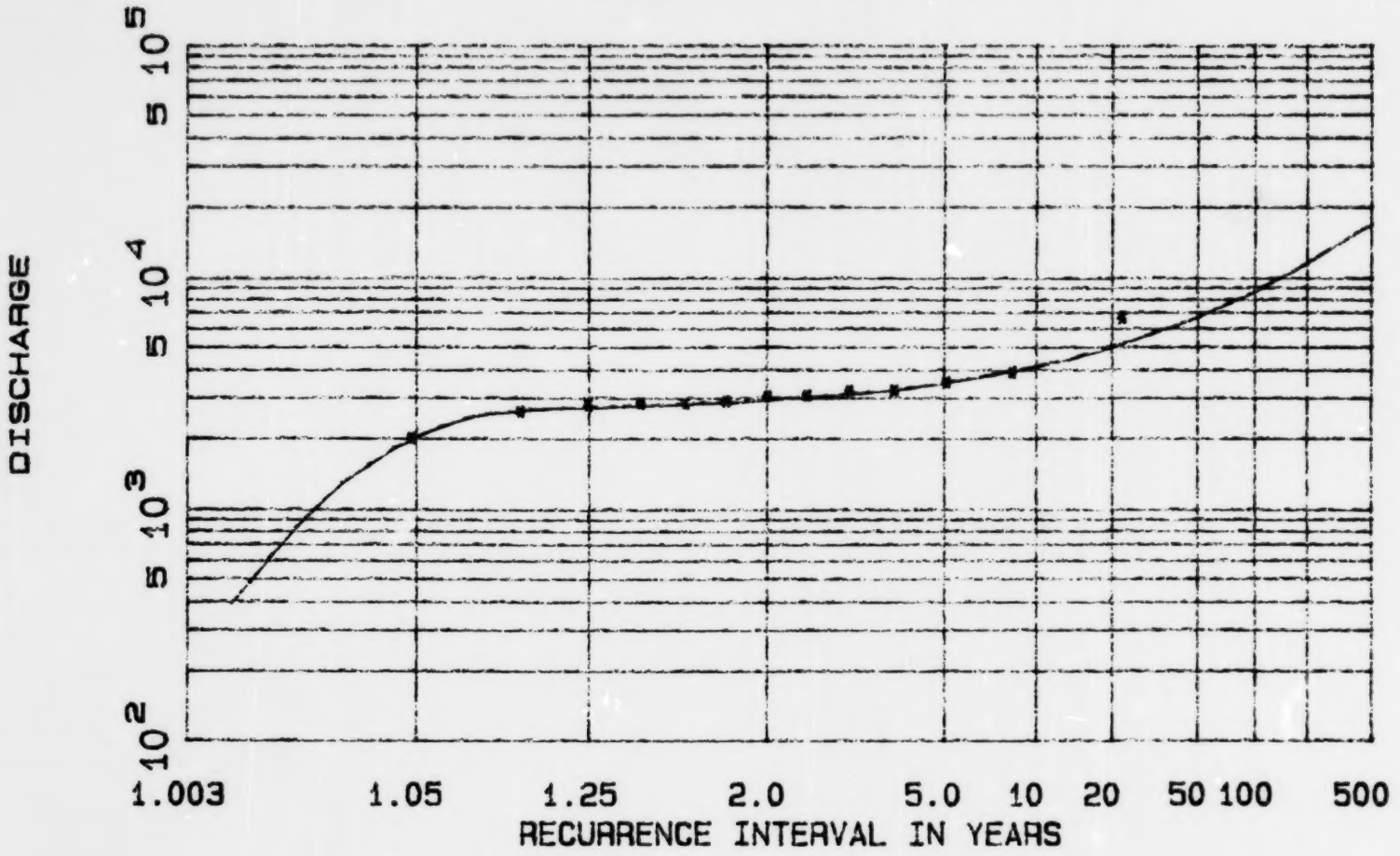
M= 0.000 A= 2675.669 B= 29.05 C= 684.647 D= 0.496

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	224.00
1.050	0.952	2040.00
1.250	0.800	2750.00
2.000	0.500	2960.00
5.000	0.200	3510.00
10.000	0.100	4140.00
20.000	0.050	5020.00
50.000	0.020	6760.00
100.000	0.010	8720.00
200.000	0.005	11500.00
500.000	0.002	16900.00

06MA036C THELON R. ABOVE BAKER, BELOW SCHULTZ LAKES

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=06JC002
WSC STATION NAME=THELON RIVER ABOVE BEVERLY LAKE

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1974	1250.000	8180.000*	1	4.92	20.333
6	1975	1390.000	3590.000	2	13.11	7.625
6	1976	1570.000	2425.000	3	21.31	4.692
6	1977	1490.000	2340.000	4	29.51	3.389
6	1978	1640.000	1640.000	5	37.70	2.652
99	1979	2340.000	1570.000	6	45.90	2.179
5	1980	872.000	1490.000	7	54.10	1.848
6	1981	1230.000	1440.000	8	62.30	1.605
6	1982	1440.000	1390.000	9	70.49	1.419
99	1983	2425.000	1250.000	10	78.69	1.271
6	1984	8180.000	1230.000	11	86.89	1.151
6	1985	3590.000	872.000	12	95.08	1.052

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
06JC002 THELON RIVER ABOVE BEVERLY LAKE

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	2284.750	1993.896	0.873	2.746	12.154
LN X SERIES	7.528	0.595	0.079	1.520	6.789
LN(X-A) SERIES	6.815	1.035	0.152	0.141	5.544

X(MIN)= 872.000
X(MAX)= 8180.000
LOWER OUTLIER LIMIT OF X= 522.665

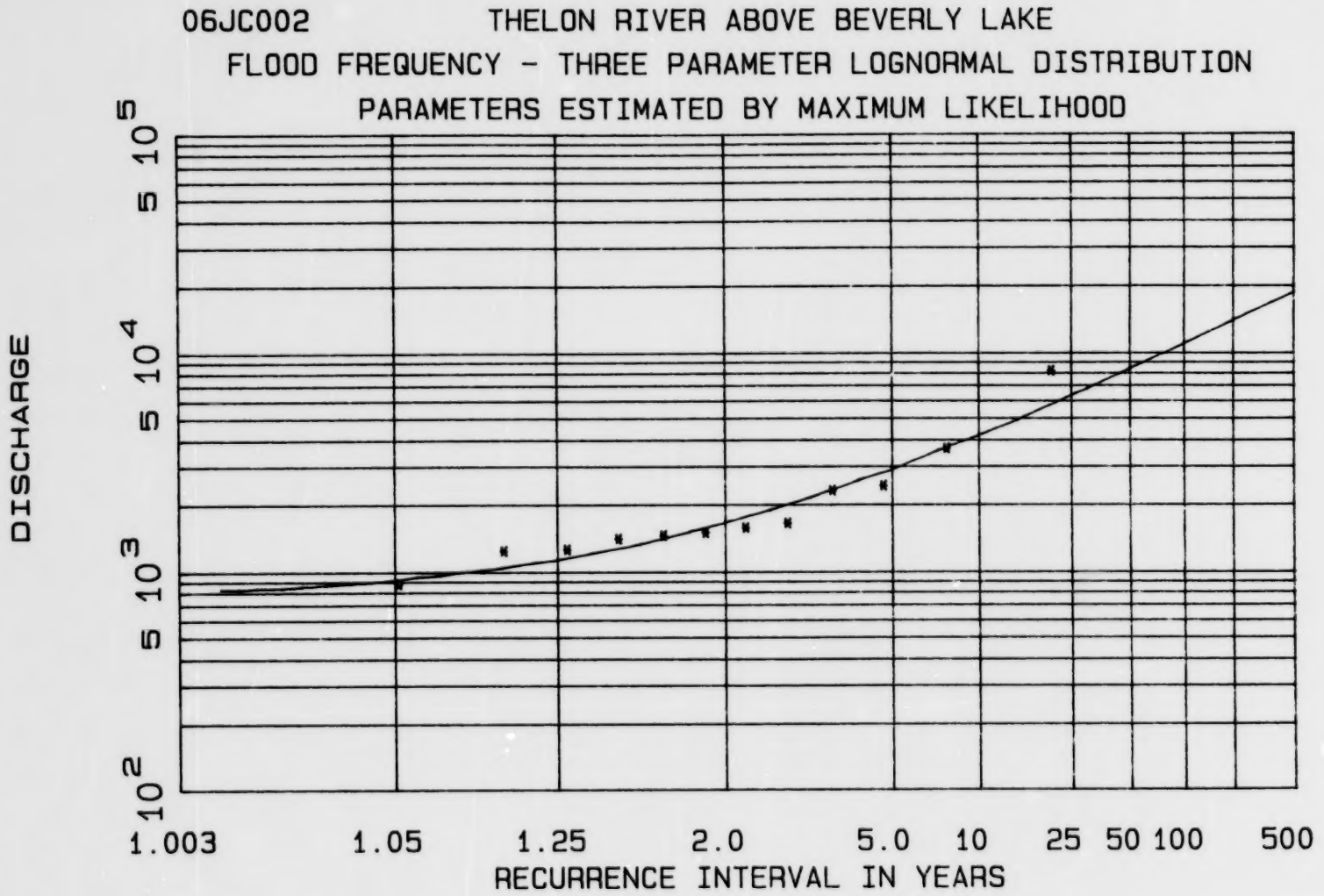
TOTAL SAMPLE SIZE= 12
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 758.342 M= 6.815 S= 1.035

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	811.00
1.050	0.952	920.00
1.250	0.800	1140.00
2.000	0.500	1670.00
5.000	0.200	2940.00
10.000	0.100	4190.00
20.000	0.050	5760.00
50.000	0.020	8400.00
100.000	0.010	10900.00
200.000	0.005	13900.00
500.000	0.002	18700.00


06JC002 THELON RIVER ABOVE BEVERLY LAKE
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
5 10^5
5 10^4
5 10^3
10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=07QC003
WSC STATION NAME=THOA RIVER NEAR INLET TO HILL ISLAND

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
10	1970	47.000	264.000	1	3.70	27.000
5	1971	56.900	197.000	2	9.88	10.125
6	1972	117.000	145.000	3	16.05	6.231
5	1973	96.000	142.000	4	22.22	4.500
7	1974	96.600	133.000	5	28.40	3.522
5	1975	145.000	117.000	6	34.57	2.893
5	1976	142.000	108.000	7	40.74	2.455
6	1977	73.100	100.000	8	46.91	2.132
5	1978	52.400	96.600	9	53.09	1.884
6	1979	100.000	96.000	10	59.26	1.688
5	1980	90.700	90.700	11	65.43	1.528
7	1981	108.000	77.600	12	71.60	1.397
6	1982	264.000	73.100	13	77.78	1.286
6	1983	77.600	56.900	14	83.95	1.191
8	1984	133.000	52.400	15	90.12	1.110
5	1985	197.000	47.000	16	96.30	1.038

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
07QC003 THOA RIVER NEAR INLET TO HILL ISLAND

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	112.269	56.214	0.501	1.453	6.269
LN X SERIES	4.617	0.466	0.101	0.232	3.682
LN(X-A) SERIES	4.314	0.624	0.145	-0.132	3.560

X(MIN)= 47.000
X(MAX)= 264.000
LOWER OUTLIER LIMIT OF X= 35.016

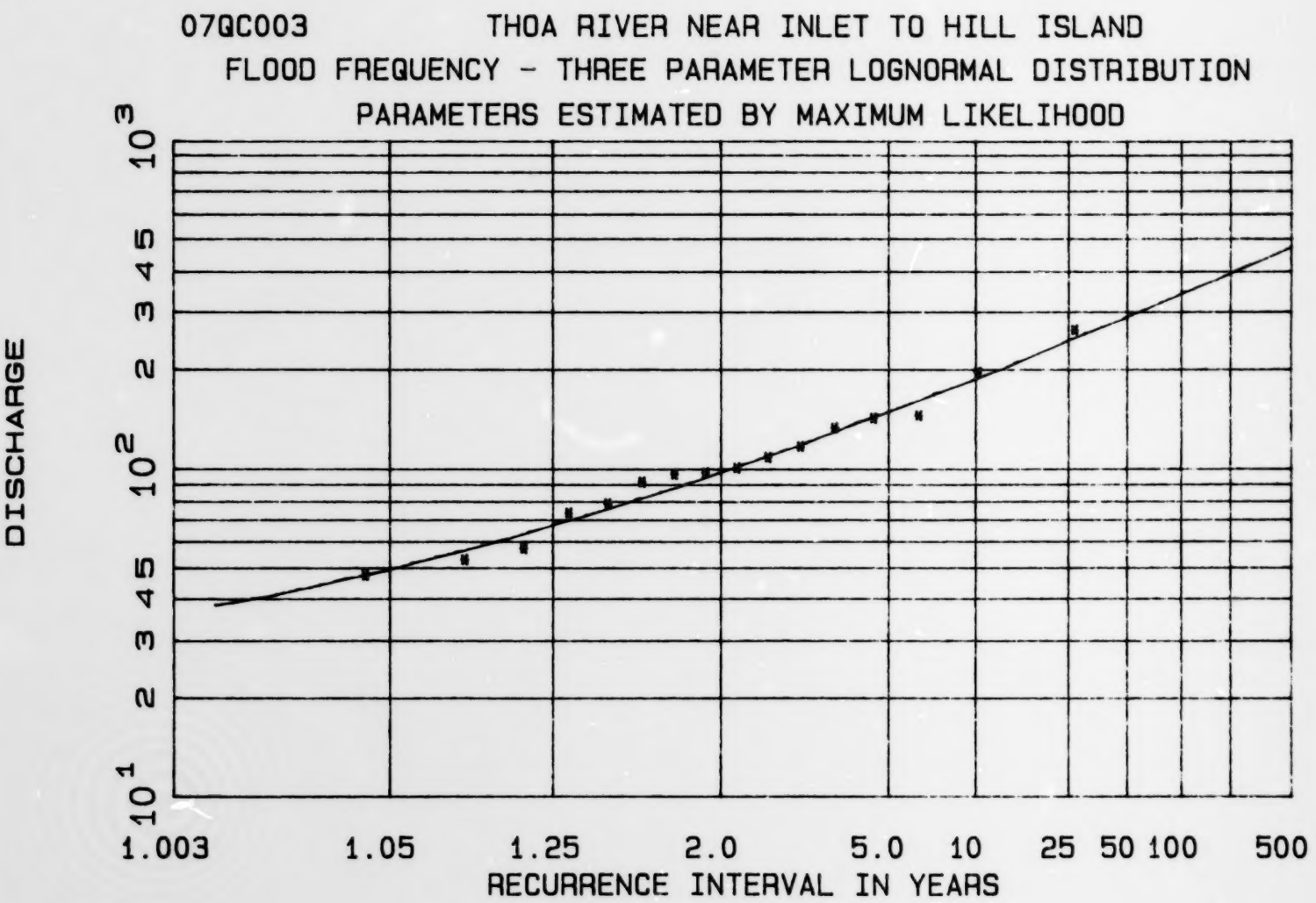
TOTAL SAMPLE SIZE= 16
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 23.148 M= 4.314 S= 0.624

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	36.60
1.050	0.952	49.50
1.250	0.800	67.30
2.000	0.500	97.90
5.000	0.200	149.00
10.000	0.100	189.00
20.000	0.050	232.00
50.000	0.020	292.00
100.000	0.010	342.00
200.000	0.005	396.00
500.000	0.002	474.00


07QC003 THOA RIVER NEAR INLET TO HILL ISLAND
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
2 3 4 5
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10QA001
WSC STATION NAME=TREE RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
8	1969	135.000	190.000	1	3.49	28.667
6	1970	108.000	173.000	2	9.30	10.750
7	1971	93.400	170.000	3	15.12	6.615
7	1972	173.000	165.000	4	20.93	4.778
7	1973	102.000	141.000	5	26.74	3.739
7	1974	94.900	140.000	6	32.56	3.071
7	1975	140.000	135.000	7	38.37	2.606
7	1976	170.000	129.000	8	44.19	2.263
7	1977	127.000	127.000	9	50.00	2.000
7	1978	100.000	108.000	10	55.81	1.792
7	1979	98.000	102.000	11	61.63	1.623
7	1980	93.300	100.000	12	67.44	1.483
6	1981	129.000	98.000	13	73.26	1.365
7	1982	165.000	95.300	14	79.07	1.265
7	1983	190.000	94.900	15	84.88	1.178
7	1984	141.000	93.400	16	90.70	1.103
7	1985	95.300	93.300	17	96.51	1.036

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10QA001 TREE RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	126.759	32.274	0.255	0.614	2.726
LN X SERIES	4.813	0.247	0.051	0.372	2.319
LN(X-A) SERIES	5.055	0.196	0.039	0.418	2.385

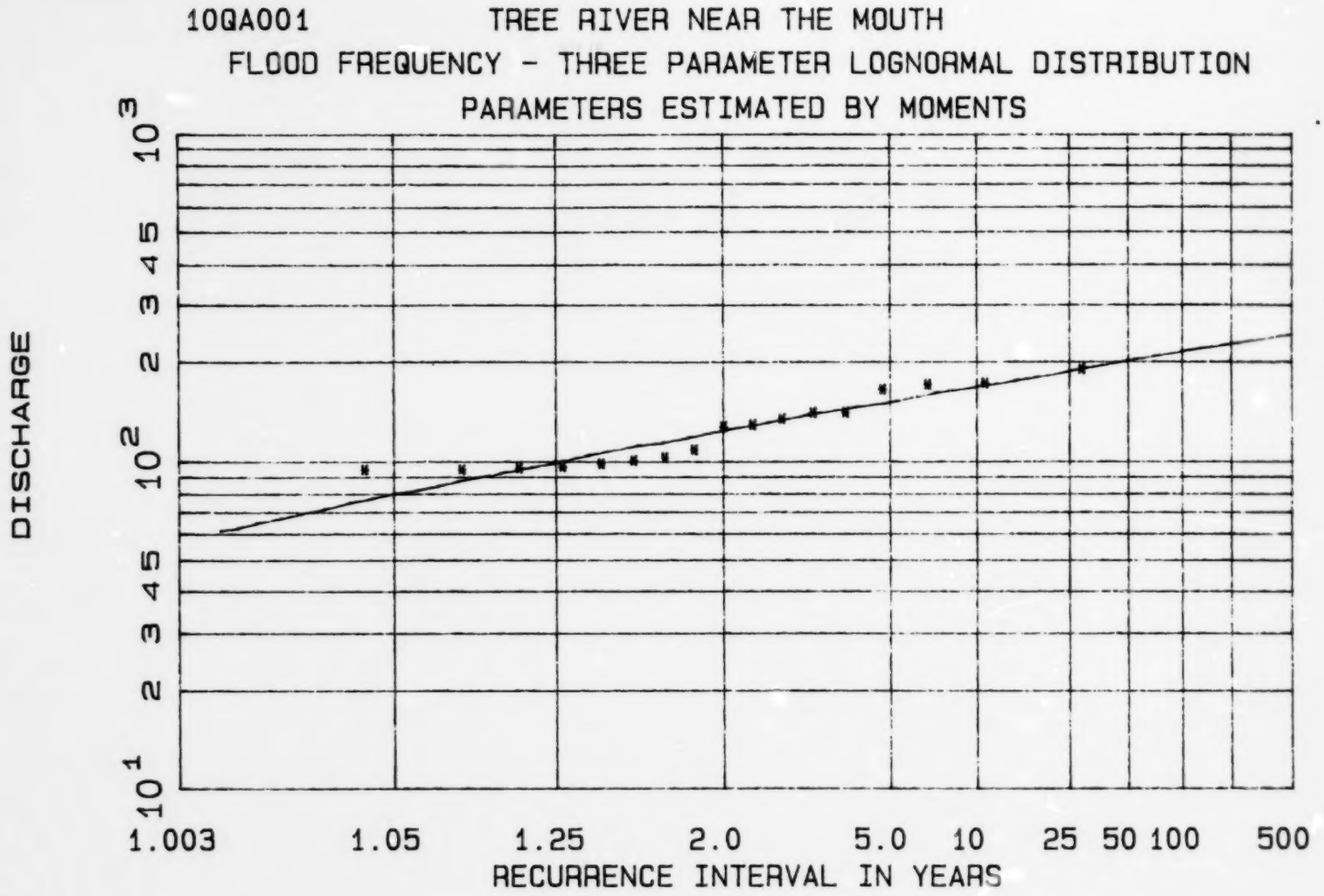
X(MIN)= 93.300 TOTAL SAMPLE SIZE= 17
X(MAX)= 190.000 NO. OF LOW OUTLIERS= 0
LOWER OUTLIER LIMIT OF X= 69.658 NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

3LN PARAMETERS: A= -32.977 M= 5.054 S= 0.200

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	57.40
1.050	0.952	79.20
1.250	0.800	99.30
2.000	0.500	124.00
5.000	0.200	152.00
10.000	0.100	169.00
20.000	0.050	185.00
50.000	0.020	203.00
100.000	0.010	216.00
200.000	0.005	229.00
500.000	0.002	245.00


10QA001 TREE RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

FREQUENCY ANALYSIS - GENERALIZED EXTREME VALUE DISTRIBUTION
10QA001 TREE RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	126.759	32.274	0.255	0.614	2.726
LN X SERIES	4.813	0.247	0.051	0.372	2.319

X(MIN)= 93.300 TOTAL SAMPLE SIZE= 17
X(MAX)= 190.000 NO. OF LOW OUTLIERS= 0
LOWER OUTLIER LIMIT OF X= 69.658 NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

DISTRIBUTION IS UPPER BOUNDED AT (U+A/K)= 0.3819E+03
GEV PARAMETERS: U= 113.10 A= 28.346 K= 0.105

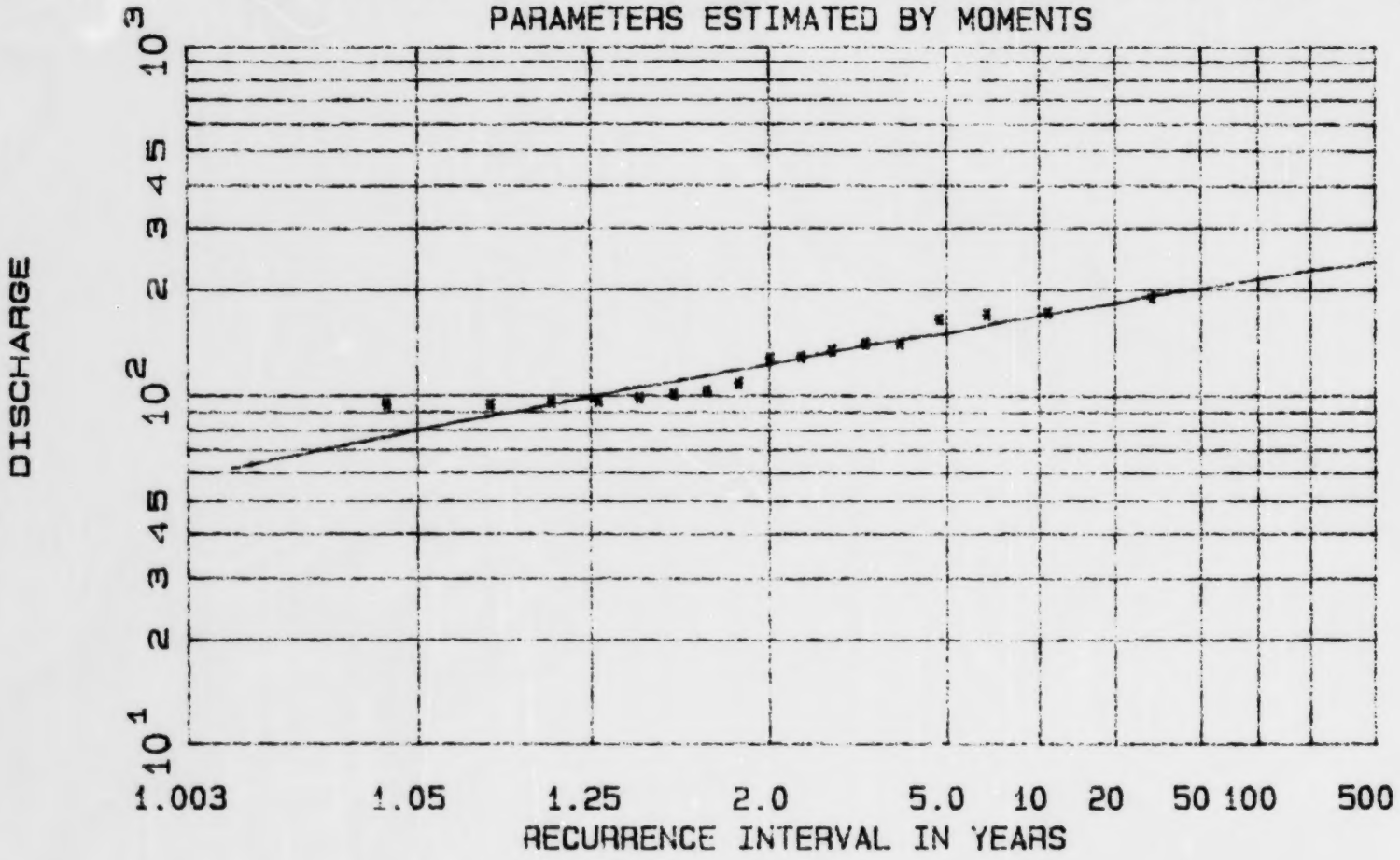
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	58.30
1.050	0.952	79.60
1.250	0.800	99.30
2.000	0.500	123.00
5.000	0.200	152.00
10.000	0.100	170.00
20.000	0.050	185.00
50.000	0.020	204.00
100.000	0.010	216.00
200.000	0.005	228.00
500.000	0.002	242.00

10QA001 TREE RIVER NEAR THE MOUTH

FLOOD FREQUENCY - GENERALIZED EXTREME VALUE DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - LOG PEARSON TYPE III DISTRIBUTION
10QA001 TREE RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	126.759	32.274	0.255	0.614	2.726
LN X SERIES	4.813	0.247	0.051	0.372	2.319

X(MIN)= 93.300
X(MAX)= 190.000
LOWER OUTLIER LIMIT OF X= 69.658

TOTAL SAMPLE SIZE= 17
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MOMENTS

LP3 PARAMETERS: A= 0.4589E-01 B= 28.93 LOG(M)= 3.485
M = 32.64

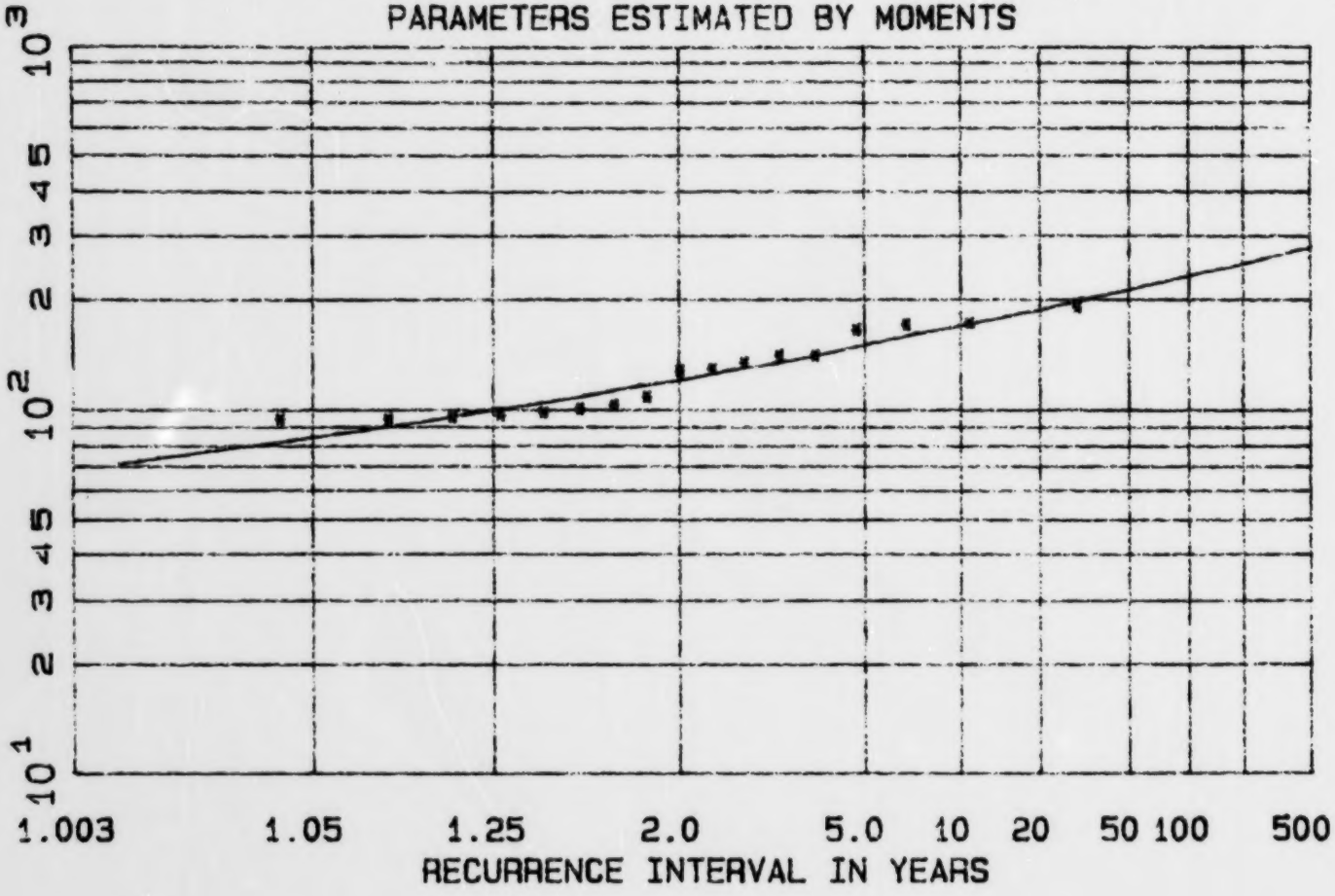
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	68.90
1.050	0.952	83.90
1.250	0.800	99.70
2.000	0.500	121.00
5.000	0.200	151.00
10.000	0.100	170.00
20.000	0.050	189.00
50.000	0.020	214.00
100.000	0.010	234.00
200.000	0.005	253.00
500.000	0.002	281.00

10QA001 TREE RIVER NEAR THE MOUTH

FLOOD FREQUENCY - LOG PEARSON TYPE III DISTRIBUTION

PARAMETERS ESTIMATED BY MOMENTS



FREQUENCY ANALYSIS - WAKEBY DISTRIBUTION
10QA001 TREE RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	126.759	32.274	0.255	0.614	2.726
LN X SERIES	4.813	0.247	0.051	0.372	2.319

X(MIN)= 93.300
X(MAX)= 190.000
LOWER OUTLIER LIMIT OF X= 69.658

TOTAL SAMPLE SIZE= 17
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

THE FOLLOWING WAKEBY PARAMETERS WERE OBTAINED VIA ITERATION FOR PARAMETER B, ASSUMING M TO BE NON-ZERO.

M= 72.758 A= 9.902 B= 45.03 C= -199.794 D=-0.285
DISTRIBUTION IS UPPER BOUNDED AT E= 0.2825E+03

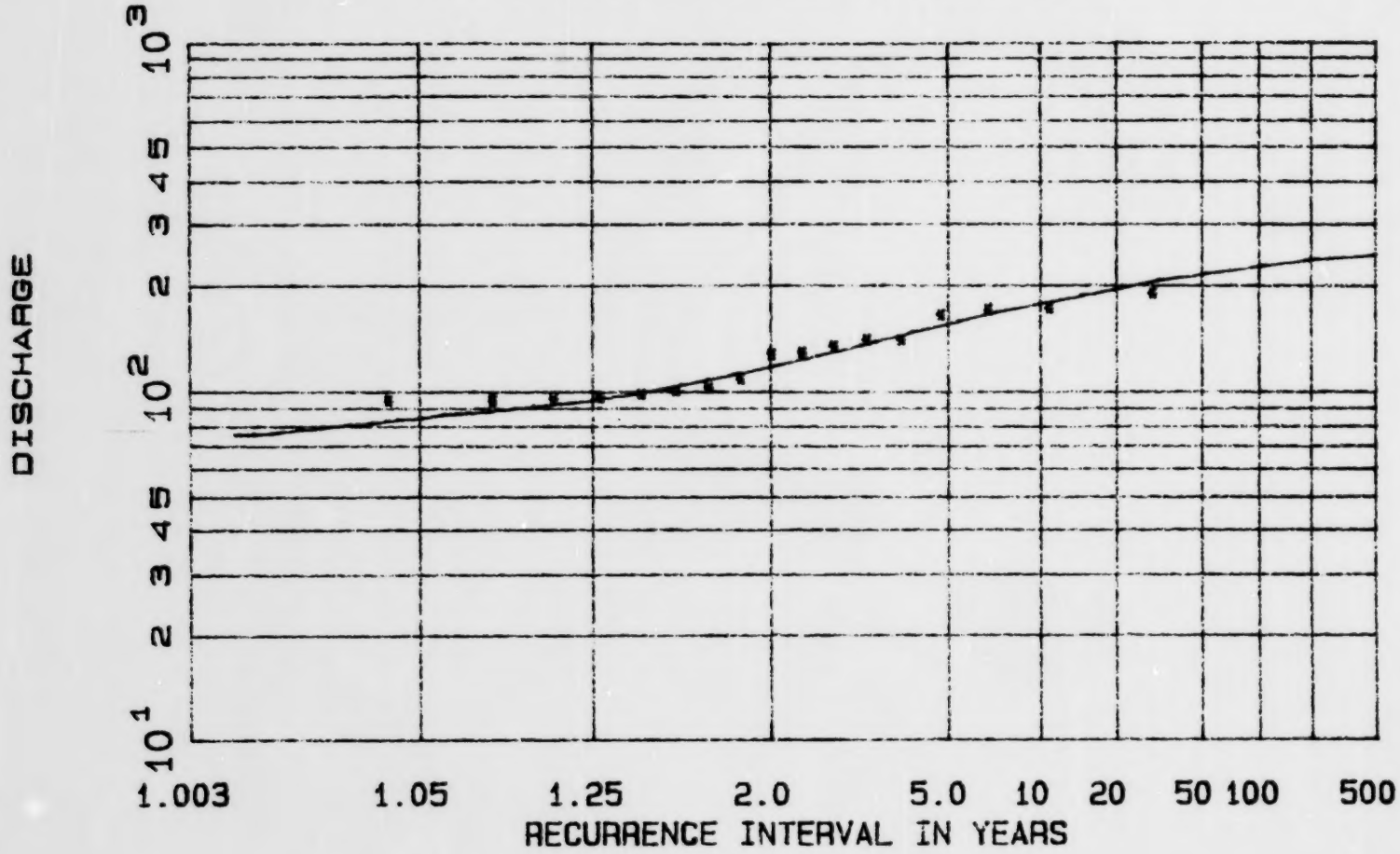
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	74.20
1.050	0.952	84.30
1.250	0.800	95.00
2.000	0.500	118.00
5.000	0.200	156.00
10.000	0.100	179.00
20.000	0.050	197.00
50.000	0.020	217.00
100.000	0.010	229.00
200.000	0.005	238.00
500.000	0.002	248.00

10QA001

TREE RIVER NEAR THE MOUTH

FLOOD FREQUENCY - WAKEBY DISTRIBUTION



WSC STATION NO=10EA002
WSC STATION NAME=TROUT RIVER AT FORT SIMPSON HWY

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
7	1973	214.000	522.000	1	4.55	22.000
5	1974	238.000	311.000	2	13.13	8.250
5	1975	127.000	275.000	3	19.70	5.077
5	1976	269.000	269.000	4	27.27	3.667
6	1977	311.000	266.000	5	34.85	2.870
5	1978	131.000	238.000	6	42.42	2.357
5	1979	275.000	216.000	7	50.00	2.000
7	1980	43.500	214.000	8	57.58	1.737
5	1981	216.000	152.000	9	65.15	1.535
5	1982	522.000	131.000	10	72.73	1.375
5	1983	266.000	127.000	11	80.30	1.245
9	1984	91.700	91.700	12	87.88	1.138
5	1985	152.000	43.500*	13	95.45	1.048

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10FA002 TROUT RIVER AT FORT SIMPSON HWY

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	219.708	121.178	0.552	1.074	6.285
LN X SERIES	5.234	0.630	0.120	-0.878	5.311

X(MIN)= 43.500
X(MAX)= 522.000
LOWER OUTLIER LIMIT OF X= 47.628

TOTAL SAMPLE SIZE= 13
NO. OF LOW OUTLIERS= 1
NO. OF ZERO FLOWS= 0

AFTER REMOVAL OF ZEROES AND/OR LOW OUTLIERS

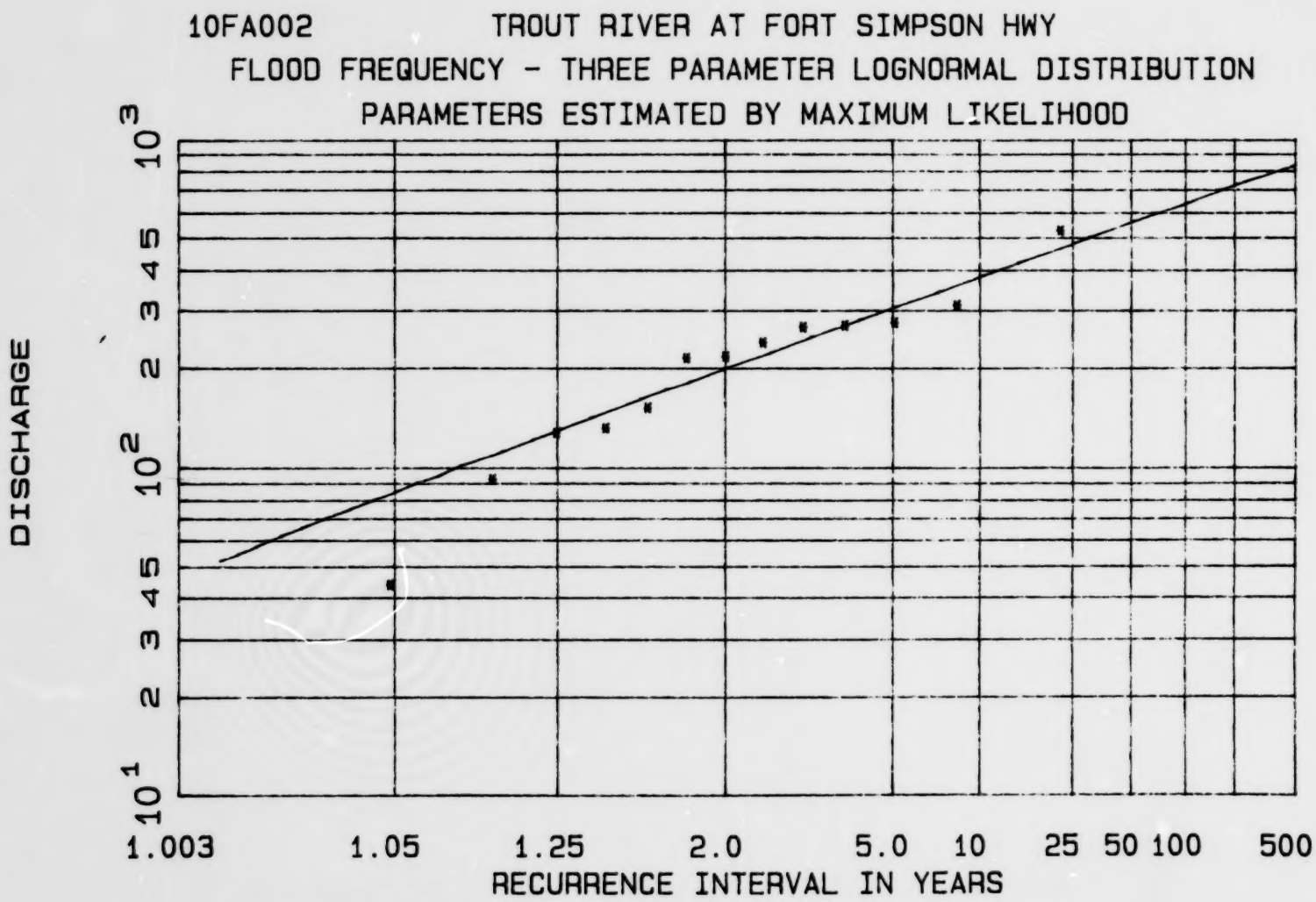
	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	234.392	113.847	0.486	1.372	7.120
LN X SERIES	5.356	0.473	0.088	-0.033	4.171
LN(X-A) SERIES	5.400	0.452	0.084	0.017	4.199

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

PARAMETERS OF THE 3LN WHICH DUPLICATES THE CONDITIONAL FUNCTION:
A= -8.741 M= 5.344 S= 0.486

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	46.30
1.050	0.952	84.30
1.250	0.800	130.00
2.000	0.500	201.00
5.000	0.200	306.00
10.000	0.100	382.00
20.000	0.050	457.00
50.000	0.020	559.00
100.000	0.010	640.00
200.000	0.005	723.00
500.000	0.002	839.00


10FA002 TROUT RIVER AT FORT SIMPSON HWY
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^3
2 3 4 5
10^2
2 3 4 5
10^1
2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10HA002
WSC STATION NAME=TSICHU RIVER AT CANOL ROAD

MONTH	YEAR	DATA (3) (CMS)	ORDERED (4) (CMS)	RANK (5)	PROB. (6) (%)	RET. PERIOD (7) (YEARS)
(1)	(2)					
6	1976	24.900	47.900	1	5.88	17.000
7	1977	13.100	42.400	2	15.69	6.375
6	1978	30.000	30.000	3	25.49	3.923
6	1979	25.000	27.400	4	35.29	2.833
7	1980	14.500	27.000	5	45.10	2.217
5	1981	23.400	25.000	6	54.90	1.821
6	1982	27.400	24.900	7	64.71	1.545
6	1983	42.400	23.400	8	74.51	1.342
5	1984	47.900	14.500	9	84.31	1.186
7	1985	27.000	13.100	10	94.12	1.062

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10HA002 TSICHU RIVER AT CANOL ROAD

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	27.560	10.805	0.392	0.698	4.689
LN X SERIES	3.246	0.403	0.124	-0.255	4.364
LN(X-A) SERIES	3.462	0.324	0.094	-0.070	4.335

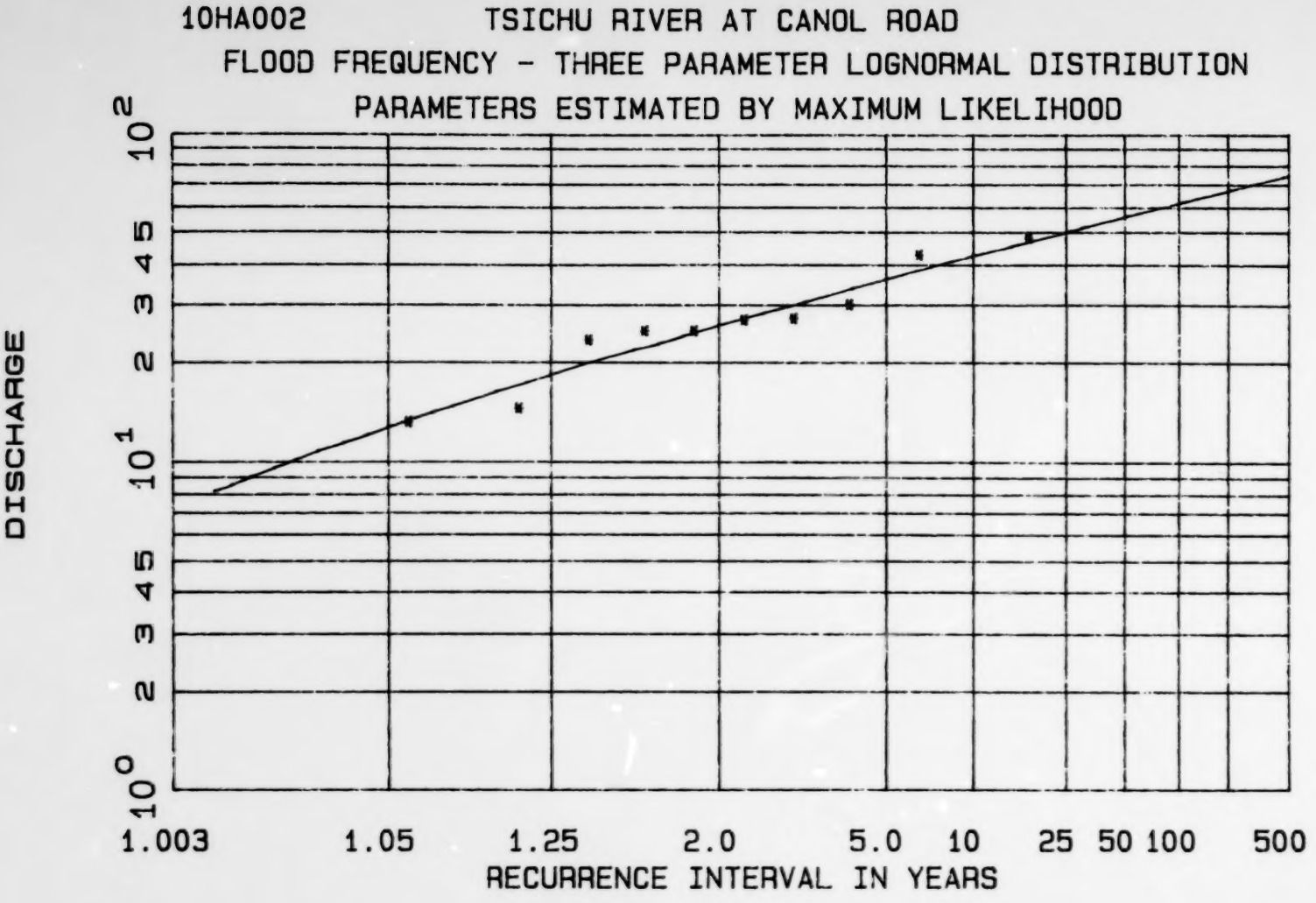
X(MIN)= 13.100 TOTAL SAMPLE SIZE= 10
X(MAX)= 47.900 NO. OF LOW OUTLIERS= 0
LOWER OUTLIER LIMIT OF X= 11.302 NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= -5.839 M= 3.462 S= 0.324

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	7.25
1.050	0.952	12.70
1.250	0.800	18.40
2.000	0.500	26.00
5.000	0.200	36.00
10.000	0.100	42.40
20.000	0.050	48.50
50.000	0.020	56.20
100.000	0.010	61.90
200.000	0.005	67.60
500.000	0.002	75.10


10HA002 TSICHU RIVER AT CANOL ROAD
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^0 2 3 4 5 10^1 2 3 4 5 10^2
1.003 1.05 1.25 2.0 5.0 10 25 50 100 500
RECURRENCE INTERVAL IN YEARS

WSC STATION NO=10GB001
WSC STATION NAME=WILLOWLAKE RIVER NEAR THE MOUTH

MONTH	YEAR	DATA	ORDERED	RANK	PROB.	RET. PERIOD
(1)	(2)	(3) (CMS)	(4) (CMS)	(5)	(6) (%)	(7) (YEARS)
6	1965	504.000	1240.000	1	2.83	35.333
5	1966	654.000	1070.000	2	7.55	13.250
5	1967	974.000	1050.000	3	12.26	8.154
6	1968	289.000	974.000	4	16.98	5.889
99	1969	509.000	858.000	5	21.70	4.609
8	1970	399.000	850.000	6	26.42	3.786
99	1971	483.000	744.000	7	31.13	3.212
5	1972	595.000	670.000	8	35.85	2.789
5	1973	850.000	654.000	9	40.57	2.465
5	1974	1050.000	648.000	10	45.28	2.208
5	1975	858.000	595.000	11	50.00	2.000
5	1976	595.000	595.000	12	54.72	1.828
5	1977	450.000	519.000	13	59.43	1.683
5	1978	402.000	509.000	14	64.15	1.559
5	1979	744.000	504.000	15	68.87	1.452
5	1980	344.000	483.000	16	73.58	1.359
5	1981	648.000	450.000	17	78.30	1.277
5	1982	1240.000	402.000	18	83.02	1.205
5	1983	670.000	399.000	19	87.74	1.140
7	1984	519.000	344.000	20	92.45	1.082
5	1985	1070.000	289.000	21	97.17	1.029

NOTE A "99" IN COLUMN #1 INDICATES THAT THE DATA WAS ESTIMATED.

FREQUENCY ANALYSIS - THREE-PARAMETER LOGNORMAL DISTRIBUTION
10GB001 WILLOWLAKE RIVER NEAR THE MOUTH

SAMPLE STATISTICS

	MEAN	S.D.	C.V.	C.S.	C.K.
X SERIES	659.381	260.855	0.396	0.713	3.212
LN X SERIES	6.418	0.394	0.061	0.026	2.842
LN(X-A) SERIES	6.254	0.463	0.074	-0.113	2.950

X(MIN)= 289.000
X(MAX)= 1240.000
LOWER OUTLIER LIMIT OF X= 237.564

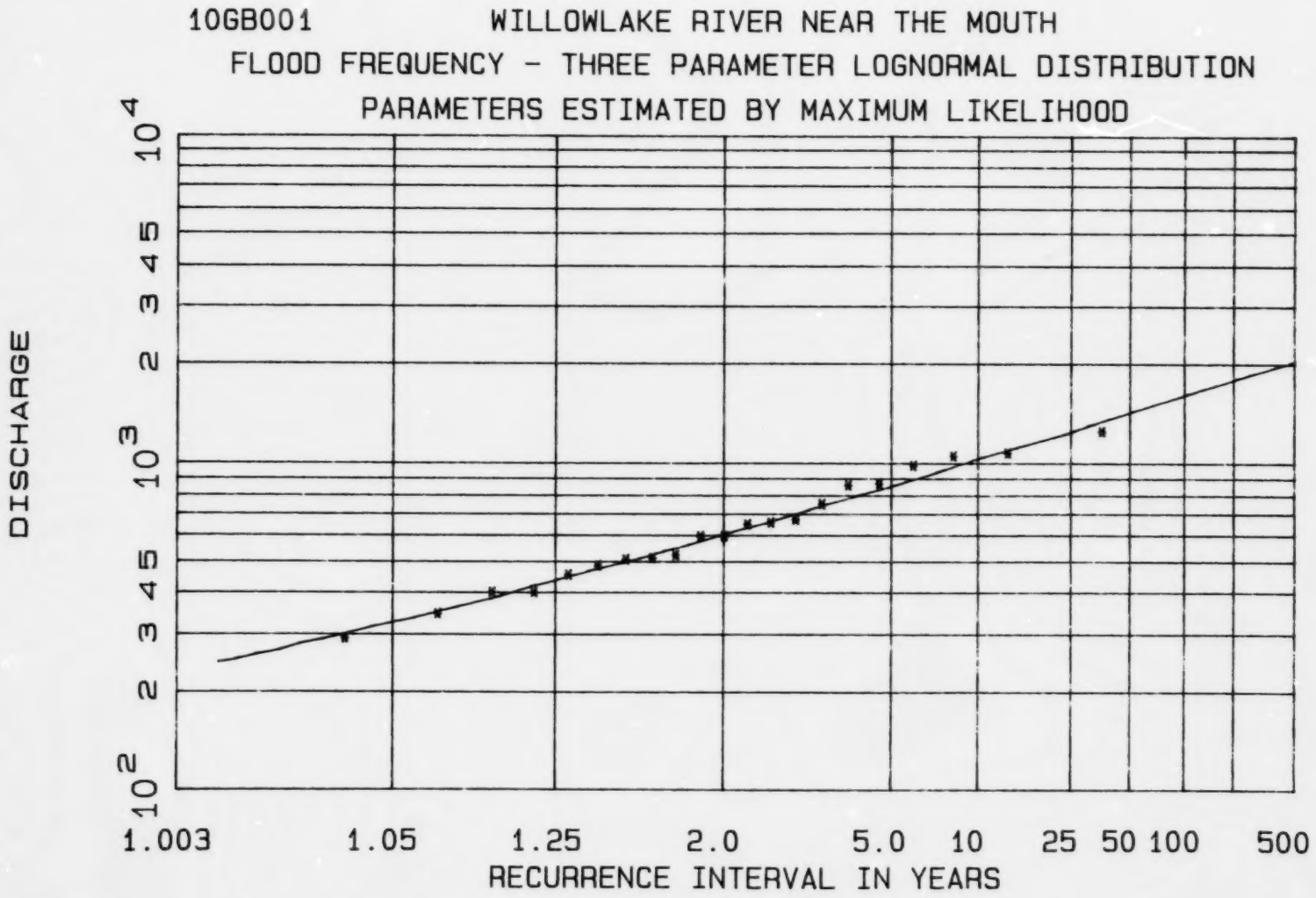
TOTAL SAMPLE SIZE= 21
NO. OF LOW OUTLIERS= 0
NO. OF ZERO FLOWS= 0

SOLUTION OBTAINED VIA MAXIMUM LIKELIHOOD

3LN PARAMETERS: A= 84.978 M= 6.254 S= 0.463

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	0.997	231.00
1.050	0.952	325.00
1.250	0.800	437.00
2.000	0.500	605.00
5.000	0.200	853.00
10.000	0.100	1030.00
20.000	0.050	1200.00
50.000	0.020	1430.00
100.000	0.010	1610.00
200.000	0.005	1800.00
500.000	0.002	2060.00


10GB001 WILLOWLAKE RIVER NEAR THE MOUTH
FLOOD FREQUENCY - THREE PARAMETER LOGNORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD
DISCHARGE
10^4
2 3 4 5
10^3
2 3 4 5
10^2
1.003
1.05
1.25
2.0
5.0
10
25
50
100
500
RECURRENCE INTERVAL IN YEARS